Curriculum Design and Innovative Application of the "Dual Case" Teaching Method

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Abstract. This research, rooted in university-enterprise collaboration and focusing on the "New Business" type of courses in the new era, introduces the innovative concept of "Dual Case." By combining "real enterprise cases" with "virtual teaching cases," a comprehensive "Dual Case" resource platform is constructed for course development. The "Dual Case" teaching model is applied throughout the entire teaching process, and empirical analysis is conducted. The study employs sample t-tests to analyze the teaching effectiveness of the "Dual Case" approach. This approach addresses challenges such as limited course resources, difficulties in teaching implementation, and a lack of diverse teaching evaluation methods. The research holds significant importance for enhancing the quality of business-related courses and elevating the competence of business professionals.

Keywords: curriculum design, curriculum innovation, empirical research

1 Introduction

With the rapid development of the economy in the era of big data, enhancing the quality of talent cultivation and deepening educational reforms have become critical tasks for the development of our times. Case-based teaching methods are widely employed in disciplines such as management (business studies), law, and medicine. However, traditional case-based teaching often adopts a "one case throughout" approach, using a single case to span an entire class. While emphasizing the application of key theoretical knowledge, this approach tends to overlook the memorization of theories themselves and the comprehensiveness of theoretical understanding. Consequently, students find it challenging to construct a comprehensive and systematic knowledge framework. The "Dual Case" teaching method, focusing on the collection of "Dual Cases" resources and building a platform for "Dual Case" teaching resources, is applied throughout the entire teaching process. This provides a new approach to cultivate high-quality talent in the "New Business" field.

2 Literature Review

The origin of case-based teaching can be traced back to Harvard Law School in 1870 when Christopher Columbus Langdell became the dean. Langdell introduced the case-based teaching method, initially applied in Harvard Law School and later extended to the Medical School and Business School [1]. Through continuous application and research at Harvard

EIMT 2024, March 29-31, Wuhan, People's Republic of China
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DOI 10.4108/eai.29-3-2024.2347684

University, case-based teaching gained prominence and became a model for institutions worldwide. In the 1950s, American scholars redefined case-based teaching, advocating the integration of cases and theoretical content, adapting new teaching materials, and emphasizing the importance of practical application alongside theoretical knowledge. The concept of integrating case-based teaching with other methods to enrich the classroom experience gained traction. In 1984, the establishment of the "World Case Teaching Research and Application Association" marked the maturation of case-based teaching [2]. More scholars began researching its applications, gradually gaining recognition and adoption across various fields. However, there is limited literature on the "Dual Case" teaching method in foreign sources.

In China, research on case-based teaching emerged in 1981 [3]. After attending the first case-based teaching training session in Dalian, Li and others summarized the training content and introduced American business management education [4]. Post-2000, research on case-based teaching in China entered a rapid development stage, primarily applied in disciplines such as management (business studies), law, and medicine. In business education, the Dalian Enterprise Management Case Teaching Training became the earliest case-based teaching initiative in China. Through the analysis of real enterprise cases, it aimed to cultivate students' analytical and decision-making abilities. In legal education, Wang and others were among the first to research the application of case-based teaching in legal education [5]. They proposed reforms in traditional rote teaching, suggesting the introduction of case-based teaching to enhance the practical application capabilities of law students. In medical education, Qu conducted early research on the application of case-based teaching in clinical education, emphasizing the use of real clinical cases to cultivate students' practical and clinical thinking abilities [6]. With the development of case-based teaching, it is now widely used in various educational stages, including undergraduate, vocational, secondary, and primary education.

While there is a substantial body of research on case-based teaching, the study of "Dual Cases" remains limited. A search on CNKI (China National Knowledge Infrastructure) for "Dual Case Teaching" yielded only 32 related articles. Li, Y. et al., addressed the demands of finance-related professionals and students for Visual Basic programming teaching [7]. They designed two major cases under the guidance of software engineering development methods, one solving several minor problems around students to complete the learning of knowledge points, skill points, and implementation technologies, and the other addressing issues related to professional application of the course. Jaffery, Z., explored and implemented a problem-oriented Shanghan Lun Dual Case Teaching method [8]. They proposed ten main modes of Dual Cases, such as positive and negative, progressive, analogy, misdiagnosis, correction, knowledge transmission, meridian, organ pathology, expansion, and integration. The study achieved satisfactory results in teaching. Toh, W. addressed the insufficient debugging skills of most newly recruited university students in their program [9]. They conducted enterprise research to clarify the skill requirements for software technology talents, proposing a combination of excellent and defective case-based teaching resources.

3 High-Quality "New Business Studies" Talent Demand Research

With the advent of the digital economy era, traditional business undergoes significant transformations, giving rise to new business models and the emergence of "New Business

Studies." This study, employing face-to-face interviews and survey questionnaires, delves into the demand for business talents in the context of "New Business Studies" across various enterprises [10][11]. The surveyed entities include large state-owned enterprises, private enterprises, small and medium-sized enterprises, production-oriented companies, and service-oriented businesses. The research targets employees of enterprises and institutions, ranging from company leadership to mid-level managers.

Insights from face-to-face interviews reveal that, when facing graduates with business-related majors, most enterprises prioritize fundamental qualities. These include alignment with corporate culture, integrity, strong stress resistance, and a particular emphasis on students' learning capabilities and potential for development. There is an increased demand for graduates' professional expertise, focusing not only on fundamental professional qualities but also on practical skills. Ideally, graduates should be capable of addressing real-world work issues without additional training, possessing a certain level of industry analysis ability.

The survey questionnaire primarily targets personnel from corporate entities, with a predominant focus on individuals with associate degrees. This approach ensures a meaningful contribution to the discussion on higher vocational education in business studies, thereby guaranteeing the scientific validity of the questionnaire data. A total of 108 valid responses were collected in this survey. According to the survey results, concerning the professional knowledge of business studies graduates, enterprises deem problem-solving abilities and a solid foundation in professional knowledge as most crucial, accounting for 88.89% and 87.04%, respectively. Following closely are big data thinking and data processing and analysis abilities, at 77.78%. Interdisciplinary knowledge breadth and a broad perspective are considered significant, with percentages of 74.07% and 72.22%, respectively. Industry understanding and analysis capabilities hold a percentage of 53.7%(Figure 1).

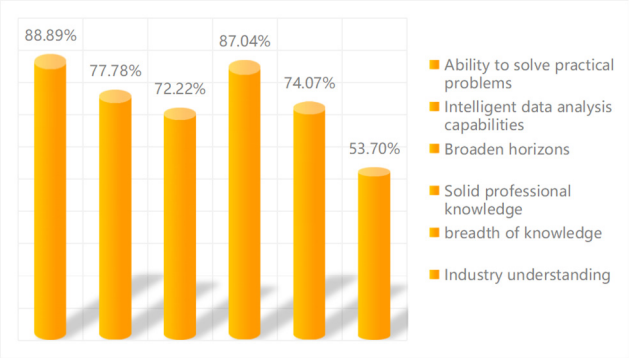

Figure. 1. Survey on graduates' professional ability needs

Based on the results of the above questionnaire, it can be found that under the background of "new business", enterprises have greatly improved their requirements for the knowledge, ability and quality of graduates of higher vocational business majors. "New business" majors involve more fields than traditional business, and are more extensive, interdisciplinary, and integrated. Therefore, companies' demand for new business talents not only focuses on the accumulation of basic professional knowledge, but also requires interdisciplinary knowledge. In the context of big data, companies have higher requirements for the sensitivity of talent data

and the ability to master big data tools. However, what companies are most concerned about is the ability and level of graduates to get started immediately and solve practical problems. .

4 Empirical Analysis

4.1 Dual-Case Teaching Practical Application Model

The dual-case teaching aims to cultivate students' mastery of effective learning methods and enhance their problem analysis and solving skills. To achieve this teaching objective, it is crucial to integrate case resources seamlessly across the three stages of "pre-class + in-class + post-class" and incorporate them into various aspects of teaching preparation, design, and evaluation.

During the lesson preparation phase, the initial step involves reflecting on the previous lesson, including feedback on case utilization from the instructor. Based on practical teaching experiences, suggestions for case supplementation are proposed and discussed. Subsequently, the selection of real enterprise cases and virtual teaching cases for the next class is made, with the option to supplement new cases as needed. Each instructor, considering the characteristics of their teaching classes, selects cases from the backup cases for teaching design.

To achieve the teaching objectives for each project, teaching design focuses on key and difficult points. Unlike traditional teaching designs, the entire teaching process adopts a dual-case-driven model, integrating theory with practice and combining real enterprise cases with virtual teaching cases. The teaching process includes the following steps:

Evaluate the completion of the previous class's case homework, point out issues, and provide further explanations.

Introduce a case based on the project's characteristics. For monotonous content, real enterprise cases are selected to stimulate student interest. For complex and challenging content, virtual teaching cases are introduced gradually to provoke student thinking.

Use PPT presentations to explain fundamental knowledge points and address the introduced cases.

The instructor selects a case opposite in type to the introduced case. All students use the learned content to solve the case. During the case analysis, students may encounter issues, which the instructor addresses. Simultaneously, the instructor identifies students' common mistakes to assist in constructing new virtual teaching cases.

Based on students' performance, share encountered problems and solutions. For typical issues, the instructor demonstrates and guides all students on problem-solving methods.

Introduce cutting-edge cases related to the project content, guiding students to focus on new developments and changes, expanding their perspectives.

Traditional teaching evaluations often focus on students' outcomes and grades. The dual-case teaching evaluation should adopt a "multi-subject, multi-dimensional, whole-process" assessment approach, emphasizing goal-oriented evaluation across aspects such as "process + results + value-added." Leveraging online teaching support systems ensures the integration of

teaching and comprehensive information collection and assessment throughout the entire process(Figure 2).

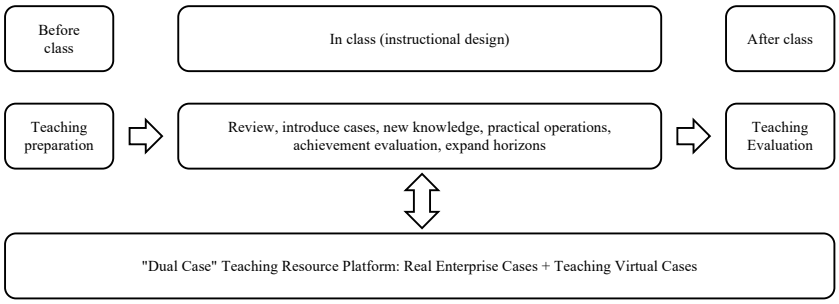

Figure. 2. Dual-Case Teaching Process

4.2 Analysis of the Implementation Effect of Dual-Case Teaching

To examine the effectiveness of the dual-case teaching model, the Economic Management Department of the author's college selected equivalent parallel classes to form an experimental group (60 students) and a control group (60 students). The experimental group adopted the dual-case teaching model, while the control group followed the traditional teaching model. The study recorded the academic records of both groups during the 2022-2023 academic year. A comparative analysis was conducted on the final assessment scores, professional competition results, and various certificate assessment scores to explore the implementation effects of the dual-case teaching model.

4.2.1 Analysis Method

Given the large and diverse dataset in this study, it is necessary to analyze different data characteristics and research objectives. Therefore, the independent sample t-test method was employed, and SPSS software was used to analyze the experimental data.

In this analysis, the independent variable was defined as the teaching model (0 for the traditional teaching model, 1 for the dual-case teaching model). There were three dependent variables in the experiment:

Final Assessment Scores (1-5): (Ratings: 5 for scores above 90, 4 for scores between 80-90, 3 for scores between 70-80, 2 for scores between 60-70, and 1 for scores below 60, considered as a fail).

Professional Competition Scores (1-5): (Ratings: 5 for winning national-level competition awards, 4 for provincial-level competition awards, 3 for municipal-level competition awards, 2 for university-level competition awards, and 1 for not winning any competition awards).

Certificate Scores (1-5): (Ratings: 5 for obtaining professional qualifications or skill certificates related to the major, 4 for obtaining 1+X certificates related to the major, 3 for obtaining English Level 6, computer level certificates, 2 for obtaining driving licenses, and 1 for not obtaining any certificates).

The t-test requires that the populations represented by the two samples follow a normal distribution, and the variances of the two populations are equal (homogeneity of variance). If

the variances are not equal, the t' test can be used, or variable transformation can be performed, or the rank-sum test method can be employed.

Through the t-test, the analysis examines independent samples from two populations, inferring whether there is a significant difference in the means of the two populations. This analysis aims to understand the impact of implementing the dual-case teaching model and the traditional teaching model on students' abilities.

4.2.2 Analysis Results

A t-test analysis was conducted on the teaching model and the level data of final assessment scores (table 1). The results showed a significance level of 0.05 (t=2.313, p=0.024). In a detailed difference analysis, the average level of final assessment scores under the dual-case teaching model (4.33) was significantly higher than the average level under the traditional teaching model (3.73). There was a significant difference in the two samples of teaching models and final assessment score level data. The dual-case teaching model enhanced students' mastery of course knowledge and improved their skill levels. Overall, the learning outcomes of students were significantly enhanced under the dual-case teaching model.

Table 1. t-test scores of teaching mode and course final assessment grade data

t test analysis results				
	Teaching mode (mean ± standard deviation)		t	p
	"Double case" teaching (n=30)	Traditional teaching (n=30)		
Course final assessment results	4.33±0.88	3.73±1.11	2.313	0.024*

* p<0.05 ** p<0.01

A t-test analysis was performed on the teaching model and the level data of professional competition scores (table 2). The results showed a significance level of 0.001 (t=3.505, p=0.001). In a detailed difference analysis, the average level of professional competition scores under the dual-case teaching model (2.27) was significantly higher than the average level under the traditional teaching model (1.30). There was a significant difference in the two samples of teaching models and professional competition score level data. The dual-case teaching model elevated students' professional competency, significantly increased their enthusiasm for participating in competitions, and led to outstanding achievements in professional competitions.

Table 2. t-test analysis of teaching model and professional competition performance grade data

t test analysis results				
	Teaching mode (mean ± standard deviation)		t	p
	"Double case" teaching (n=30)	Traditional teaching (n=30)		
Professional competition results	2.27±1.36	1.30±0.65	3.505	0.001**

* p<0.05 ** p<0.01

A t-test analysis was conducted on the teaching model and the level data of various certificate scores (table 3). The results revealed a significance level of 0.001 (t=5.539, p=0.000). In a detailed difference analysis, the average level of various certificate scores under the dual-case teaching model (3.80) was significantly higher than the average level under the traditional teaching model (2.27). There was a significant difference in the two samples of teaching models and various certificate score level data.

The dual-case teaching model not only enhanced students' professional competency but also elevated their overall quality. Under the dual-case teaching approach, students achieved outstanding results in professional qualification exams and skill assessments. Furthermore, they demonstrated a willingness to explore new areas and actively utilized their spare time to obtain relevant certificates.

Table 3. t-test analysis of teaching model and grade data of various grade certificates

t test analysis results				
	Teaching mode (mean ± standard deviation)		t	p
	"Double case" teaching (n=30)	Traditional teaching (n=30)		
Various grade certificate results	3.80±1.00	2.27±1.14	5.539	0.000**

* p<0.05 ** p<0.01

Based on the above analysis, the implementation of the "dual case" teaching model can not only improve the learning effect of students' courses, significantly improve their knowledge, ability and skill levels, but also improve students' comprehensive quality, professional competition ability and related certificate acquisition rate. Improved significantly.

5 Conclusion

This study creates a "double case" resource platform for courses from "real corporate cases + teaching virtual cases", applies the "double case" teaching model to the whole teaching process, uses T-test method to analyze the "double case" teaching effect, and solves the problem of course Problems include lack of resources, difficulties in teaching implementation and single teaching evaluation. By applying the "double case" teaching method to actual teaching, the quality of courses has been significantly improved, and the student course passing rate, certificate holding rate, employment rate and achievement conversion rate have been significantly improved, which has been recognized by students and enterprises.

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