Exploration of the "Three-Dimensional Integration and Dual-Wheel Drive" Project-Based Practical Teaching Model—Taking the Construction of an International Business Course Group as an Example

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Abstract. To address the pain points in international economics and trade talent training, such as fragmented courses, disconnection between theory and practice, and insufficient technological empowerment, and to meet enterprises' demands for "cross-boundary, data-driven, and scenario-based" talents in the era of digital trade, this study explores the construction of a "three-dimensional integration and dual-wheel drive" project-based practical teaching model. With the entire international business process as the logical mainline, the model systematically integrates six core courses, including International Business, International Marketing, Business and Economic Statistics, International Business Data Mining and Analysis Training, International Marketing Strategic Planning and Scheme Formulation Training, and Export Commodity Exhibition and Trade Negotiation. It forms a "three-dimensional integration" framework featuring horizontal curriculum collaboration, vertical competency progression, and the integration of virtual and physical scenarios, supplemented by a "dual-wheel drive" mechanism consisting of an internal cycle of discipline competitions and an external cycle of enterprise needs. The implementation paths include the construction of the course group system, hierarchical project design, AI-enabled integration of virtual and physical teaching, and the establishment of an industry-university collaborative education mechanism. Practice has shown that this model effectively improves students' professional competencies, achieves precise alignment between talent training and industrial needs, and provides a replicable and promotable practical paradigm for teaching reforms in similar majors.

Keywords: Project-based learning, Course group construction, International business, Three-dimensional integration, Dual-wheel drive.

1 Introduction

The 2024 National Education Conference clearly put forward the major deployment of "coordinating the implementation of the strategy for invigorating the country

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through science and education, the talent-driven development strategy, and the innovation-driven development strategy, and promoting the integrated development of education, scientific and technological innovation, and talent training", pointing out the direction for higher education reform in the new era. China Education Modernization 2035 lists "deepening the integration of industry and education and strengthening the training of innovative talents" as one of the key tasks in the field of higher education.

Undergraduate education serves as a foundational stage for solidifying theoretical knowledge while cultivating practical skills, innovation, and scientific reasoning. [1] The landscape of talent cultivation in higher education is diverse, varying by institutional type, academic level, operational model, service orientation, training objectives, pedagogical approaches, curriculum content, and administrative systems.[2]

Project-Based Learning (PBL) is a student-centered pedagogy where faculty-guided teams leverage resources to construct knowledge and enhance comprehensive abilities through practical innovation both inside and outside the classroom.[3] Effective top-level design in this area prioritizes the coordination and integration of various initiatives. By unifying project planning and fostering multi-stakeholder collaboration, institutions can address governance fragmentation, improve systemic coherence, and drive the holistic development of higher education. [4] Notably, universities in the United States and Germany employ integrated talent models that emphasize interdisciplinary, broad-spectrum curricula to facilitate cross-disciplinary convergence.[5]

Against this backdrop, the quality of international business talent training is directly related to the construction of the new development pattern of "dual circulation" and the advancement of the "Belt and Road" Initiative. Currently, global trade is accelerating its digital transformation, digital trade is booming, and the global industrial chain is undergoing in-depth restructuring. Enterprises' demand for international business talents is increasingly showing a trend of "cross-boundary, data-driven, and scenario-based". Talents are not only required to master traditional international trade theories and processes but also need to possess interdisciplinary knowledge integration capabilities, data-driven decision-making capabilities, and complex scenario problem-solving capabilities. However, the talent training models of most university economics and trade majors have prominent problems such as fragmented curriculum systems, disconnection between theory and practice, and insufficient technological empowerment, making it difficult to meet the needs of high-quality talents amid industrial transformation. Therefore, relying on the construction of course groups and exploring the "three-dimensional integration and dual-wheel drive" project-based practical teaching model is an effective path to realize the systematic integration of knowledge and promote the connotative development of international economics and trade majors.

2 Practical Dilemmas in the Construction of International Economics and Trade Course Groups

2.1 Fragmented Curriculum System and Disrupted Competency Chains

The fragmentation of the curriculum system is the most prominent dilemma in the current teaching of international economics and trade majors, which is mainly reflected in the "isolated operation" of curriculum settings and the "scattered separation" of knowledge systems. For example, courses such as Business and Economic Statistics, International Marketing Strategic Planning and Scheme Formulation Training, and International Business Data Mining and Analysis are mostly taught independently. Teachers of each course focus on their own teaching content, lacking cross-curricular collaborative design and content connection, resulting in the fragmentation of the knowledge system.

For instance, Business and Economic Statistics focuses on teaching data collection and statistical analysis methods but fails to effectively connect with the application of data analysis results in the subsequent course, International Marketing Strategic Planning and Scheme Formulation Training. Although students master statistical tools, they struggle to transform them into the basis for strategic decision-making. In addition, there are concurrent problems of duplicated curriculum content and missing key connection points. Some basic theories are repeatedly taught in multiple courses, while key connection content such as "how to transform data analysis results into marketing decisions" and "data application in cross-border e-commerce operations" is absent, further exacerbating the disconnect in competency training.

2.2 Disconnection Between Theory and Practice and Mismatch Between Supply and Demand

At present, classroom teaching in most universities is still dominated by theoretical lectures. Teachers explain knowledge points around textbook content, supplemented by simple interactive forms such as case analysis and classroom discussions, lacking immersive training in real industrial scenarios that allow students to participate deeply. Most cases in textbooks are classic or outdated, which have a significant gap with the current industrial reality of booming digital trade and deepened RCEP regional cooperation. Students find it difficult to grasp industry cutting-edge trends and enterprise business needs through classroom learning. This directly leads to a prominent phenomenon of "separation of learning and application" among students, with severely insufficient practical capabilities. Enterprises generally feedback that graduates are unfamiliar with cross-border e-commerce platform operations, unable to independently complete international market research, lack practical experience in business negotiations, and have insufficient awareness of international trade compliance risks. This mismatch between supply and demand not only increases the cost of talent training for enterprises but also weakens the employment competitiveness of graduates, making it difficult for them to meet the requirements of international business talents in the era of digital trade.

2.3 Insufficient Technological Empowerment and Lagging Technological Transformation

Against the background of the deep integration of AI technology into education and teaching, the problem of insufficient technological empowerment has become increasingly prominent, becoming an important bottleneck restricting the improvement of talent training quality. Although some universities have introduced smart teaching platforms such as Rain Classroom and Chaoxing, and some courses have attempted to use AI tools to assist teaching, overall, the application of technology mostly remains at shallow functions such as attendance checking and quizzes, failing to form a deep empowerment system covering the entire process of "teaching, learning, and evaluation".

In the teaching link, the application of AI technology lacks pertinence and depth, and there is no dynamic portrait of students' abilities; there is a lack of AI-based virtual simulation teaching scenarios, making it difficult for students to carry out training such as business data analysis and operation, business negotiations, and full-process international trade practice in a highly simulated international business environment, resulting in high practical thresholds and limited effects. In the learning link, students lack intelligent learning auxiliary tools, and it is difficult for them to quickly complete data cleaning, modeling, and visualization analysis when facing complex international market data. In the evaluation link, traditional result-oriented evaluation such as exams and papers still dominates, and the application of AI technology in process-oriented evaluation is insufficient, making it difficult to comprehensively and objectively reflect students' mastery of knowledge, practical abilities, and innovative awareness. The lag in technological empowerment makes it difficult for professional talent training to adapt to the requirements of data-driven decision-making capabilities and technological application capabilities for talents in the era of digital trade, resulting in students lacking core competitiveness in the job market and restricting the deepening and upgrading of professional teaching reforms.

3 Ideas of the "Three-Dimensional Integration and Dual-Wheel Drive" Project-Based Practical Teaching

Combined with the characteristics of international economics and trade talent training, the construction of the course group adheres to the training philosophy of "solid foundation, strong practice, innovation-oriented, and competency enhancement". It adheres to the three major concepts of "outcome-based education, student-centeredness, and continuous improvement", takes the improvement of students' abilities as the core goal of course group construction, uses students' learning effects as the evaluation basis, and establishes a multi-dimensional feedback and improvement mechanism. It constructs a practical teaching chain that runs through the entire process of international economics and trade talent training to ensure the continuity and systematicness of practical competency training.

3.1 Integrated Integration

Breaking the barriers of independent courses, taking the entire international business process as the logical mainline, six courses including International Business, International Marketing, Business and Economic Statistics, International Business Data Mining and Analysis Training, International Marketing Strategic Planning and Scheme Formulation Training, and Export Commodity Exhibition and Trade Negotiation are systematically integrated. Guided by the training philosophy of "solid foundation, strong practice, innovation-oriented, and competency enhancement", the knowledge and ability system of the international business course group is reconstructed to form a complete competency chain of "data analysis, strategic design, and trade practice", realizing the coordinated development of knowledge and abilities.

3.2 Progressive Competency Training

Following the law of ability development of "cognition-simulation-practice", a progressive training path of "theory-tool-practice" is designed, and a hierarchical project task system with the core logic of "theoretical foundation, tool empowerment, practical training, and ability improvement" is constructed. The cognitive stage lays a solid theoretical foundation, the simulation stage strengthens scenario application and communication and collaboration abilities, and the practical stage cultivates innovative abilities and the ability to solve practical problems, realizing the spiral improvement of abilities. The project tasks of each stage are both independent and interconnected, and the achievements of the previous stage lay the foundation for the development of the next stage, forming a closed-loop training chain.

3.3 Integration of Virtual and Physical Teaching

Integrating AI digital tools with physical practice scenarios to build an immersive learning ecosystem. A virtual-physical combination model of "on-campus experiments, enterprise training" is formed. Virtual scenarios rely on AI data analysis tools and international trade simulation platforms to carry out low-cost and high-repeatability practical training, reducing the threshold for practical operations; physical scenarios verify learning outcomes through enterprise field research, project practice, and real project operation, realizing "substantializing virtual tasks and improving the quality of practical tasks". Through the organic connection of virtual and physical scenarios, students' learning experience and practical effects are improved, and practical talents adapting to the era of digital trade are cultivated.

3.4 Continuous Improvement Driven

A "dual internal and external circulation" driving mechanism is established. The internal circulation takes discipline competitions as nodes to realize the ability iteration of "project achievements, competition transformation, and feedback to teaching"; the external circulation is oriented to enterprise needs, forming an industry-education

closed loop of "enterprise needs, project transformation, achievement landing, and feedback improvement". Adhering to the continuous improvement route of "internal circulation and external circulation", various feedback information in the teaching process is regularly collected, and the curriculum content, project design, and teaching methods are dynamically optimized to ensure that the construction of the course group resonates with the demand for international economics and trade talents.

3.5 Industry-University Collaborative Education

Enterprises participate in the construction of the curriculum system throughout the whole process, and an industry-university collaborative education mechanism is established. Foreign trade industry experts are invited to participate in curriculum design, project guidance, and practical teaching, integrating real enterprise needs and post standards into the teaching process; joint construction of internship and training bases is carried out to provide students with real scenarios for on-the-job internships and project practice; joint "order-based" training is carried out, and training programs are customized according to enterprise needs to achieve precise alignment between talent training and post requirements, and improve students' post adaptability.

4 Implementation Plan of the "Three-Dimensional Integration and Dual-Wheel Drive" Project-Based Practical Teaching

4.1 Construction of the Course Group System

4.1.1 Composition and Orientation of the Course Group.

Centered on six core courses—Business and Economic Statistics, International Business, International Marketing, International Marketing Strategic Planning and Scheme Formulation, International Business Data Mining and Analysis, and Export Commodity Exhibitions and Transaction Negotiations, Table 1 elucidates the functional positioning and curricular articulation of each course, thereby constructing a competency development framework encompassing "data analysis, strategic design, and trade operations."

As illustrated in Table 1, Business and Economic Statistics functions as the foundational data layer, providing descriptive and inferential statistical methodologies that lay the epistemological groundwork for subsequent data mining practices. International Business Data Mining and Analysis builds on this foundation, focusing on data cleansing, modeling, and visualization to develop advanced analytical capabilities and inform data-driven strategic decision-making. The International Business course establishes a comprehensive theoretical framework incorporating RCEP provisions and cross-border e-commerce contexts, thereby constructing the macro-environmental scaffolding for marketing theory and practice. International Marketing further cultivates core competencies in market segmentation and portfolio strategy development. International Marketing Strategic Planning and Scheme Formulation then translates theoretical insights into actionable implementation via AI, enabled performance as-

sessment and dynamic optimization. Finally, Export Commodity Exhibitions and Transaction Negotiations integrates all prior knowledge and skills within authentic negotiation and contract implementation scenarios, achieving deep integration between theory and practice. This curriculum architecture reflects both vertical competency progression and horizontal interdisciplinary collaboration, forming a structured, modular, and transferable competency model for international business professionals. It is fully consistent with the goals of nurturing composite and applied talents under the New Liberal Arts initiative.

Table 1. Specific Functions of Each Course in the Course Group.

Course Name	Main Functions	Connection with Other Courses	Supporting Competencies
Business and Economic Statistics	Laying the foundation for business data analysis	Providing statistical method support for International Business Data Mining and Analysis	Data collection and basic analysis capabilities
International Business Data Mining and Analysis	Conducting in-depth data analysis	Undertaking data from Business and Economic Statistics and providing data support for International Marketing Strategic Planning	In-depth data analysis and insight capabilities
International Business	Building a theoretical framework	Providing theoretical and environmental cognition for International Marketing and Export Commodity Exhibition and Trade Negotiation	International business theory application and environmental cognition capabilities
International Marketing	Constructing marketing foundations	Undertaking environmental cognition from International Business and providing foundations for International Marketing Strategic Planning	Basic international marketing capabilities
International Marketing Strategic Planning and Scheme Formulation	Designing and implementing strategies	Undertaking foundations from International Marketing and data mining results, and providing strategic guidance for Export Commodity Exhibition and Trade Negotiation	International marketing strategy design and scheme formulation capabilities
Export Commodity Exhibition and Trade Negotiation	Implementing practical schemes	Undertaking international marketing strategic schemes and realizing the practical transformation of theories and data	International trade practice and negotiation capabilities

4.2 "Three-Dimensional Integration" Course Group Framework

Based on the six courses studied by students majoring in international economics and trade, the course group takes AI as the link to empower the entire teaching process, takes integrated project-based learning as the wing, integrates tutorial system, scientific research, and discipline competitions, and takes the integration of industry and education as the axis to construct a "horizontal, vertical, virtual-physical" three-dimensional integration of the international business course group, realizing the training of applied and innovative talents.

In terms of horizontal integration, the teaching barriers among the six courses are broken, and an inter-curricular teaching team is formed, consisting of teachers of each

course, enterprise experts, and AI technical consultants. Regular teaching seminars are held to jointly formulate the curriculum group syllabus and talent training plan, clarify the teaching focus and connection nodes of each course, and avoid content duplication and disconnection. Taking the "entire process of international business activities" as the logical mainline, the knowledge points of each course are decomposed to form a competency chain of "data analysis, strategic design, and trade practice", realizing the collaborative connection of curriculum content.

In terms of vertical integration, a progressive training path of "cognition-simulation-practice" is adopted, forming "business data analysis, data visualization, virtual exhibition, and real enterprise schemes" to achieve the spiral improvement of abilities. The cognitive stage focuses on basic data processing and theoretical cognition projects, such as "statistical analysis of market data of a certain export agricultural product" and "cognitive report on basic international business processes", helping students master basic theories and tools; the simulation stage uses international trade simulation platforms to carry out projects such as virtual exhibitions and cross-border e-commerce simulation operations, such as "data visualization analysis of RCEP regional markets" and "virtual Canton Fair exhibition scheme design", improving application capabilities and collaboration capabilities; the practical stage meets the real needs of enterprises and carries out projects such as market entry strategy planning and overseas promotion practice, such as "formulation of RCEP market entry strategy for a certain enterprise" and "overseas online promotion scheme for export commodities", cultivating innovative abilities and the ability to solve practical problems.

In terms of virtual-physical integration, AI digital tools are integrated with physical practice scenarios to build an immersive learning ecosystem. Virtual scenarios rely on Rain Classroom AI Workstation and international trade simulation systems to carry out intelligent teaching, data processing, process simulation, and business negotiation simulation activities. AI data analysis tools are used to quickly complete market data cleaning, modeling, and visualization; different roles such as exporters, importers, and banks are simulated through the simulation platform to familiarize students with the entire international trade process; AI virtual simulation tools are used to generate negotiation opponents from different cultural backgrounds to carry out highly simulated negotiation training. Physical scenarios transform virtual training results into actual outputs through enterprise field research and marketing scheme planning; cooperate with regional enterprises to establish "enterprise practice bases", arrange students for on-the-job internships, and participate in real order processing; invite enterprise experts to enter the campus to conduct practical case sharing and project guidance, allowing students to access cutting-edge industrial trends.

4.3 "Dual Internal and External Circulation" Driving Mechanism

Taking discipline competitions as nodes, a circular mechanism of ability iteration of "project achievements, competition transformation, feedback improvement, and teaching optimization" is established. The project achievements of the course group are optimized and then connected to discipline competitions at different levels. For example, the "market data statistical analysis" project in the cognitive stage is trans-

formed into an entry for the "National College Students Market Research and Analysis Competition", and the "RCEP market entry strategy scheme" project in the practical stage is transformed into an entry for the "National University Business Elite Challenge". A competition guidance team composed of an inter-curricular teaching team and enterprise experts is established to provide full-process support for participating students, improve the quality of entries, and increase the probability of winning awards.

A competition feedback and transformation mechanism is established to sort out and analyze the comments of competition judges and the excellent experience of award-winning works, extract key points for teaching improvement, and reversely optimize curriculum content and project design. For example, in response to the problem of "inaccurate target market positioning" exposed in competitions, a teaching module of "AI-enabled precise target market positioning" is added to the International Marketing course. Through the internal circulation mechanism, in the 2024-2025 academic year, students won 20 national awards in the National Business Elite Challenge, and 4 teachers of the team were awarded "Excellent Instructor".

The external circulation is oriented to enterprise needs, constructing an industry-education integration closed loop of "enterprise needs, project transformation, achievement landing, and feedback improvement", forming a "dual-wheel drive" synergy with the internal circulation. Through the establishment of a regular demand docking mechanism with regional foreign trade enterprises, real business needs such as RCEP market expansion, cross-border e-commerce operations, and international marketing planning are collected. Universities and enterprises jointly decompose the needs into implementable course group project tasks, such as "planning of RCEP member country market entry schemes for a certain food enterprise" and "cross-border e-commerce operation optimization project for a certain light industrial product".

After students complete the projects, enterprises evaluate and apply the achievements, and the application feedback and improvement suggestions from enterprises are sorted out to feed back to the teaching of the course group, optimizing curriculum content and project design. At the same time, enterprises select outstanding students for internships or direct employment based on their project practice performance, realizing the precise alignment between talent training and post needs. Through the "dual-wheel drive" mechanism, it not only improves students’ innovative abilities and competition levels with the help of discipline competitions but also strengthens the pertinence and practicality of practical teaching relying on enterprise needs, forming a virtuous cycle of "promoting learning through competitions, promoting teaching through industry, integrating competitions and teaching, and collaborating between industry and education".

5 Conclusion

The "three-dimensional integration and dual-wheel drive" project-based practical teaching model constructed in this study analyzes the dilemmas of international eco-

nomics and trade talent training and addresses the main problems such as fragmented courses, disconnection between theory and practice, and insufficient technological empowerment. The integration of the international business course group realizes the systematic reconstruction of the knowledge system; the "horizontal, vertical, virtual-physical" three-dimensional integration framework conforms to the basic law of the spiral improvement of students' abilities; the dual-wheel drive mechanism of discipline competitions and enterprise needs constructs an educational ecosystem of "integration of competitions and teaching, and collaboration between industry and education".

In the future, we will further expand the scope of practice, deepen the application of AI technology in scenarios such as cross-cultural communication simulation, continuously optimize the model details, and provide a more universal practical reference for teaching reforms in international business and related economic and management majors.

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The authors have no competing interests to declare that are relevant to the content of this article.

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