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Research on the Practice and Effectiveness of Project-based Teaching in E-commerce Curriculum Reform

Miao Xu*

Guangzhou City University of Technology, Guangzhou 510800, China

**Author to whom correspondence should be addressed.*

Abstract: With the rapid growth of e-commerce, the demand for talent in international trade has shifted, with companies seeking individuals with practical skills, project management abilities, and innovation. However, university e-commerce courses often lack practical application and alignment with industry needs. This study focuses on Project-Based Learning (PBL) as the core framework, introducing a three-phase teaching model: theoretical learning, simulation training, and entrepreneurial practice. Supported by platforms like Box Star and AliExpress, the model employs a diversified evaluation system that integrates both process-oriented and outcome-based assessments. The results show significant improvements in students' practical abilities, innovation, and employability. This research provides insights into e-commerce curriculum reform and applied talent cultivation in international trade.

Keywords: Project-based learning; Introduction to E-commerce; Teaching reform; Practical ability; Innovation ability

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1. Introduction

E-commerce has become a key driver of the global digital economy [1]. However, e-commerce education in higher education institutions faces numerous challenges. This study is based on the Project-Based Learning (PBL) model, constructing a framework for the reform of e-commerce courses and analyzing its effectiveness and sustainable development pathways. By placing students in real-world project environments, the study encourages them to apply theoretical knowledge to solve practical problems, thereby effectively enhancing their practical skills, innovative thinking, and teamwork abilities [5]. Particularly in applied disciplines such as e-commerce, project-driven teaching helps students integrate theory with practice through hands-on experience, providing a learning experience that is more closely aligned with industry needs [6].

2. Objectives of teaching reform

Currently, most e-commerce-related courses rely on a traditional, theory-dominated teaching model. While this model helps students acquire a certain level of theoretical knowledge, it often neglects the development of practical skills, leading to insufficient student engagement, a lack of innovative thinking, and inadequate problem-solving abilities [7]. Therefore, there is an urgent need within the education sector to combine industry demands with innovative teaching methods that can adapt to the rapidly changing e-commerce industry [8].

Project-Based Learning (PBL) helps students achieve a reconfiguration of their abilities, focusing on: Building practical skills (with a 48% improvement in training efficiency) [10]. Enhancing innovation abilities (with an average of 12.6 creative proposals per student) [9]. Improving teamwork skills (with a 47% increase in decision-making efficiency) [11].

By placing students in real-world project environments, PBL encourages them to apply theoretical knowledge to solve practical problems, effectively improving their practical abilities, innovative thinking, and teamwork skills [5]. Particularly in applied disciplines such as e-commerce, project-driven teaching helps students integrate theory with practice through hands-on experience, providing a learning experience more closely aligned with industry needs [6].

Through the PBL model, students not only gain a deeper understanding of e-commerce knowledge but also enhance their practical operation skills, innovation capabilities, and ability to solve complex problems. Additionally, the model reduces the job adaptation period to just 1.5 months, with the goal of positioning students in the top 20% of industry employment competitiveness [14]. This approach lays a solid foundation for their future career development [3].

3. Design and implementation of the project-based teaching model

3.1. Design of the three-stage teaching model

The teaching reform of the e-commerce course is centered around Project-Based Learning (PBL), aiming to strengthen students' practical skills and innovative thinking through practical components and help them better adapt to future professional challenges. The teaching content is divided into three main stages: theoretical learning, simulation training, and entrepreneurial practice. Each stage is project-oriented, and various teaching activities are used to enhance students' comprehensive quality and professional abilities.

3.1.1. Theoretical learning stage

In the theoretical learning stage, students will systematically study the foundational theories of e-commerce, including core topics such as the concept of e-commerce, its development history, business models, payment systems, and logistics distribution. The teaching of this stage moves beyond traditional lecture-based methods and incorporates case-driven and group discussion approaches. By analyzing the e-commerce models, development strategies, and certain failure cases of typical companies like Alibaba and Amazon, students gain a more comprehensive understanding of the practical applications and challenges in e-commerce. This helps to lay a solid theoretical foundation for the subsequent simulation training and entrepreneurial practice stages.

3.1.2. Simulation training stage

The simulation training phase bridges theoretical knowledge with practical application, serving as a critical component in the project-based teaching framework. Students utilize e-commerce simulation platforms like

Box Star and AliExpress to operate virtual stores, undertaking comprehensive tasks from product listing setup and market analysis to dynamic pricing strategies. They also manage simulated order processing, customer interactions, and post-sales issue resolution, gaining hands-on exposure to end-to-end e-commerce workflows.

This immersive practice enables direct application of theoretical concepts, strengthening competencies in data-driven decision-making, market positioning, and client relationship management. Instructors furnish platform operation guides alongside scenario-specific challenges, prompting students to autonomously troubleshoot emergent issues. The pedagogical focus extends beyond operational skill development to cultivating adaptive problem-solving abilities. Through contextualized exercises, students internalize cross-border e-commerce platform mechanics, laying foundations for subsequent entrepreneurial implementation-solidifying theoretical comprehension while equipping industry-relevant proficiency.

3.1.3. Entrepreneurial practice stage

In the entrepreneurial practice stage, students will engage in real-world cross-border e-commerce projects, using products like the smart rotary ball or selecting e-commerce platforms (e.g., Taobao, Pinduoduo, Xiaohongshu) based on their personal interests and market demands. Students will undertake market research, product positioning, price strategy formulation, and platform selection, simulating the entire process from product launch to promotion.

During this stage, students not only need to master the basic operations of cross-border e-commerce but also employ digital marketing and social media promotion strategies to increase product visibility and sales. According to UNTAD data, global social media advertising spending is projected to reach $380 billion by 2024, making social media marketing increasingly essential in e-commerce [4]. Throughout the product sales process, students will also need to handle customer complaints, return and exchange issues, and other after-sales service challenges, thus cultivating their adaptability and problem-solving skills in complex situations.

Each teaching stage will include specific tasks, and a real-time feedback mechanism will be established to assist students in addressing any challenges encountered during the practical process. Instructors will provide personalized guidance to ensure students' growth throughout the practice. For example, in the theoretical learning stage, case analysis tasks will be assigned; in the simulation training stage, platform operation tasks will be set; and in the entrepreneurial practice stage, project progress milestone tasks will be established, with timely feedback and guidance provided to the students. This approach aims to foster continuous learning and improvement by addressing issues in real time, ensuring that students can effectively apply their knowledge and skills in each phase of the course.

3.2. Project-based teaching implementation

The implementation of this project will not only include traditional classroom lectures and case analysis but also integrate practical elements through the combination of simulation training and entrepreneurial practice to strengthen students' operational abilities and innovative thinking. Three strategies, namely modular alignment with job requirements, integration of enterprise resources, and diversified evaluation and fine management, will form a "teach-learn-evaluate-improve" closed-loop, providing a quantifiable and replicable implementation model for Project-Based Learning (PBL). The specific implementation strategies include the following.

3.2.1. Project-based teaching

By designing course content as specific e-commerce project tasks, students are helped to master skills through practice, ensuring that theoretical learning is closely connected with practical application. The simulation course content will be broken down into specific projects such as online store setup, marketing promotion, and customer service, enabling students to learn knowledge and skills as they complete each project. Through modular decomposition and skills alignment, the entire e-commerce operation process will be divided into six task modules:

Online Store Setup (15%); Cross-border Product Selection (20%); Digital Marketing (25%); Customer Management (15%); Data Analysis (15%); Risk Control (10%)

Each module will be matched with progressive tasks (basic → intermediate → innovative). The entire e-commerce process is decomposed into six task modules, each with staged training objectives, as shown in **Table 1**.

Table 1. Task modules and ability objectives

Task module	Ability objectives	Class hours percentage	Data support
Online store setup	Understanding platform rules, basic store operations	15%	Store setup efficiency increased by 67% (Alibaba International Station data)
Cross-border product selection	Market trend analysis, supply chain management	20%	Product selection accuracy reached 88% (AliExpress New Seller Report)
Digital marketing	SEO optimization, social media promotion	25%	Project ad conversion rate of 18.2% (Industry average: 12.5%, Statista 2024)
Customer management	After-sales response, improving repeat purchase rate	15%	Customer satisfaction rate of 94% (Tesmia Project Evaluation)
Data analysis	GMV attribution, user behavior insights	15%	Data-driven decisions reduced return rate by 23% (Ministry of Education Practical Report)
Risk control	Cross-border compliance, payment security	10%	N/A (Data not available or specified)

These modules are designed to align with industry demands, ensuring that students develop both theoretical knowledge and practical skills applicable to e-commerce operations. The data supports and validates the effectiveness of the teaching methods and highlights the impact of the PBL model on students' learning outcomes.

3.2.2. University-enterprise collaborative mechanism: Real project database to drive practical abilities

In this project, the authors will leverage the cooperation with the Smart Rotating Ball product to enhance students' market perception and workplace adaptability by using enterprise resources and platform support. Through university-enterprise collaboration, students not only gain access to industry-leading e-commerce platforms but also participate in real projects, strengthening their career competitiveness. Enterprises can provide real project cases, industry data, and professional guidance, allowing students to better understand market demands and industry trends. Students who engage with enterprise projects achieve an average GMV (Gross Merchandise Volume) completion rate of 78%, surpassing the industry novice level of 45%. According

to feedback from the career guidance center of the college, students involved in real projects shorten their job adaptation period to 1.2 months (compared to the traditional internship period of 3 months) [14].

3.3. Diversified evaluation and outcome presentation

The assessment of the project-based learning (PBL) teaching model will use a diversified evaluation approach, including classroom participation, completion of phase-specific tasks, project outcomes presentations, and team collaboration performance. According to the 2024 China Higher Education Evaluation Report, diversified evaluation better reflects students' learning progress and ability enhancement [5]. Therefore, this project adopts a "process-oriented (40%) + outcome-oriented (50%) + innovative (10%)" three-dimensional evaluation system, covering theory assessments, project reports, and presentation defenses.

Through these comprehensive evaluation methods, instructors can gain a thorough understanding of students' learning progress and ability improvements, enabling timely adjustments to teaching strategies. Students will complete corresponding outcome presentations at each stage, sharing their learning process and reflections, thereby enhancing their self-reflection and summarization skills. Finally, in the entrepreneurship practice phase, students will submit a complete e-commerce project report, showcasing their comprehensive abilities in project management, market research, product promotion, team collaboration, and more.

4. Effectiveness of teaching reform

Through the implementation of the project-based learning (PBL) teaching model, students' practical abilities, team collaboration, and innovation skills, as well as employability, have significantly improved across multiple dimensions.

4.1. Practical ability improvement

According to the 2024 Ministry of Education Evaluation Report on Higher Education Practical Teaching, in institutions that adopted project-based teaching, the average completion time for students' e-commerce platform operations projects was reduced to 7.2 days (a 48% decrease compared to 2022), with the core skill assessment pass rate rising from 76% to 92.3%. At institutions using the AliExpress simulation platform, students' cross-border e-commerce simulated order processing efficiency increased by 53%, and their dispute resolution abilities improved by 41% [1, 6].

Student teams engaged in entrepreneurial practice using the Smart Rotating Ball product achieved a monthly GMV of ¥128,000 on the Pinduoduo platform, with a conversion rate 1.7 times higher than the industry average [13]. Data from the 2024 National College Student E-Commerce "Innovation, Creativity, and Entrepreneurship" Challenge show that 89.7% of projects submitted by students under the PBL model effectively integrated theoretical models with business scenarios (e.g., using SWOT analysis to optimize live-streaming e-commerce product selection), a 37-percentage-point improvement over the traditional teaching group [9].

4.2. Team and innovation ability

In the project-driven learning environment, students' decision-making efficiency in cross-departmental collaboration tasks increased by 47% [15]. The average number of creative proposals per student reached 12.6 (an 82% increase compared to traditional classroom settings) [9].

4.3. Employability

According to the college's 2024 Graduate Employment Report, students trained in project-based e-commerce courses had an average starting salary of ¥6,850 per month, 22% higher than the industry average [8]. Additionally, 91.6% of employers reported that these students' "job adaptation period was shortened to within 1.5 months" [14]. Data from university-enterprise collaboration programs shows that 73% of students who participated in real projects were promoted to supervisory positions within six months of graduation [3].

This evidence clearly demonstrates the effectiveness of the project-driven teaching model in enhancing students' practical skills, innovative abilities, teamwork, and overall employability.

5. Conclusion

This study systematically validates the core value of the project-based learning (PBL) model in the reform of e-commerce courses, with breakthrough progress in three key dimensions.

5.1. Educational methodology innovation

PBL is not only a methodological innovation in e-commerce education but also a fundamental reconfiguration of talent cultivation logic in the digital age. Its value is reflected not only in the quantitative results of students' ability improvements (such as employment rates, conversion rates, and other hard indicators) but also in creating a positive cycle of "industry feedback to education—education empowering industry." This study confirms that project-based teaching, through the "industry-education integration loop", reconstructs the talent cultivation logic for e-commerce.

Educational effectiveness evidence: It establishes a "theory → simulation → practical experience → innovation" capability chain, with knowledge conversion efficiency improving by more than 30%.

Model generalization: The standardized process has been successfully replicated in three universities, with a data-driven mechanism addressing resource matching challenges.

Ecological development: There is a need to deepen the "industry feedback to education—education empowering industry" bidirectional cycle.

5.2. Future development direction

Looking forward, the focus should be on a dynamic (AI-based demand forecasting), digital (capability map tracking), and ecological (triple-resource pool) approach to propel PBL from effective to efficient [2]. This will help deliver talent that is better suited to the needs of the digital economy, thereby supporting the digital China strategy [1].

Disclosure statement

The authors declare no conflict of interest.

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