Innovative Practice of Collaborative Education between Industry and Academia in Talent Cultivation in the Field of E-commerce Under the Background of Mass Entrepreneurship and Innovation

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Abstract. This study delves into the evolving demands on e-commerce talent in the "mass entrepreneurship and innovation" era, focusing on the synergy between academia and industry through internet-driven practices. It analyses e-commerce trends and the impact of internet technologies on required skills, proposing a framework for integrating internet operations in collaborative education. Through constructing practical teaching bases and developing faculty teams, the study employs multidimensional data analysis and empirical research to evaluate the efficacy of these innovative practices. Findings indicate significant enhancements in students' internet technology capabilities, innovative application, and job market competitiveness, aligning education with industry needs. The research further outlines strategies for optimizing these practices, offering valuable insights for advancing collaborative education in e-commerce and related fields.

Keywords: e-commerce; collaborative education between industry and academia; talent cultivation model

1 INTRODUCTION

As the technological revolution progresses, the e-commerce sector evolves, necessitating a novel approach to talent development. Traditional education models falter under new industry demands for innovative, tech-savvy entrepreneurs. This study delves into harnessing internet operations for bridging the gap between academia and industry in e-commerce education. It aims to transcend conventional university-enterprise collaboration, advocating for an integrated model that merges production, education, research, and application. This endeavor seeks to pave the way for e-commerce education reform and inspire similar transformations across applied disciplines.

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2 ANALYSIS OF E-COMMERCE TALENT CAPABILITY REQUIREMENTS DRIVEN BY INTERNET OPERATIONS

2.1 Analysis of E-commerce Industry Trends and Changes in Talent Demands

Amidst rapid growth, China's e-commerce sector reached 43.8 trillion yuan in 2022, with an anticipated climb to over 60 trillion yuan by 2025. This expansion is paralleled by evolving talent needs: traditional roles in operations, marketing, and customer service are increasingly in demand, alongside specialists in big data, AI, and cloud computing. Specifically, data analyst positions rose by 56% in 2022, while demand for algorithm engineers in customer service soared by 102%. This shift underscores the critical need for composite talents, blending e-commerce acumen with advanced technical skills, to drive the industry forward[1]. See Figure 1 for details.

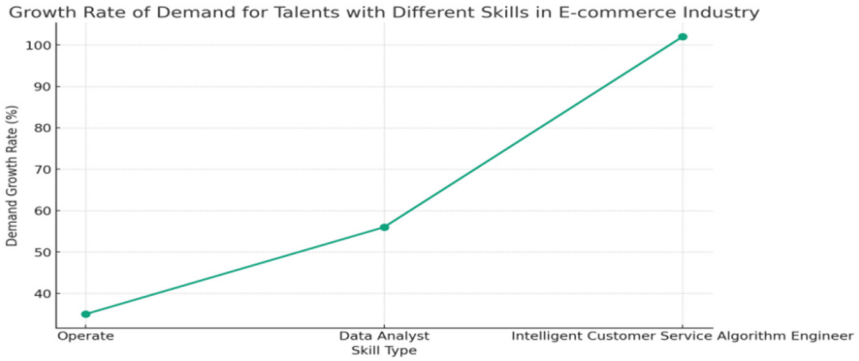

Fig. 1. Growth Rates of Talent Demand for Different Skills in the E-commerce Industry

2.2 Analysis of the Role of Internet Operation Literacy and Skills in the Skill Structure of E-commerce Talents

In analyzing the importance of talent structure in e-commerce, especially the core contribution of internet skills to the e-commerce industry, introducing a competency weight model not only helps quantify the importance of these skills but also demonstrates how e-commerce professionals' training can be strengthened through programming and data analysis skills. Consider a model where internet operation capability A, data analysis capability B, and programming capability C are the three core dimensions for evaluating e-commerce talents. The contribution of each skill can be quantified by weights w_1, w_2, w_3, satisfying the condition $w_1+w_2+w_3=1$. The comprehensive ability score S can be calculated using the following formula: $S = w_1 \times A + w_2 \times B + w_3 \times C$

Assuming the weight distribution reflects the changing demands of the industry, for instance, if data analysis becomes increasingly important in the e-commerce industry, the value of w_2 will relatively increase. Additionally, to demonstrate the practical

application of programming and data processing techniques in e-commerce operations, we provide a Python script example showing basic data analysis. The purpose of this script is to scrape price information from a series of hypothetical e-commerce product pages and calculate the average price.

```
import requests
from bs4 import BeautifulSoup
import re
# Hypothetical product page URLs
urls = ['http://example.com/product1', 'http://example.com/product2', 'http://example.com/product3']
# Storage for price information
prices = []
# Iterate through URLs, scrape price information
for url in urls:
    response = requests.get(url)
    soup = BeautifulSoup(response.text, 'html.parser')
        # Assuming price information is in <p class="price"> tag
    price_tag = soup.find('p', class_='price')
    if price_tag:
        price = re.findall(r'\d+\.\d+', price_tag.text)
        if price:
            prices.append(float(price[0]))
# Calculate average price
average_price = sum(prices) / len(prices) if prices else 0
print(f'Average price: {average_price:.2f}')
```

By incorporating such a quantified model and practical programming examples into the analysis of e-commerce talent capabilities, we not only deepen our understanding of the importance of internet skills in the current e-commerce industry but also demonstrate how these skills can be applied to solve real-world problems, thereby enhancing students' professional skills and competitiveness[2]. This methodology emphasizes that in the era of data intelligence, the training of e-commerce professionals must focus on cultivating internet literacy and computer skills to ensure that graduates can adapt to rapidly changing industry demands and lead industry development.

3 INNOVATIVE PRACTICE OF INDUSTRY-EDUCATION COLLABORATION IN E-COMMERCE MAJOR BASED ON INTERNET OPERATIONS

3.1 Application Framework Design of Internet Operations in Various Stages of Collaborative Education

In the process of collaborative education between industry and academia in e-commerce, the importance of internet operation is reflected in its profound influence on teaching models. In order to further meet the diverse learning needs of students, we

plan to comprehensively implement various teaching methods such as project-based learning, case analysis, simulation, and practical training. Through case analysis, students can delve into the actual problems faced by the e-commerce industry, thereby gaining a deeper understanding of the industry. Project-based learning allows students to participate in real or simulated business projects, and the challenges encountered in the actual operation process will greatly enhance their problem-solving abilities. In addition, simulation and practical training provide students with close-to-real business environments, allowing them to try various solutions in a safe simulated environment, thus honing their practical operational skills. The combination of these teaching models not only promotes the comprehensive development of students' skills but also ensures that the teaching content matches the specific needs and interests of students through personalized learning paths, maximizing learning effectiveness. Through such teaching innovations, our aim is to cultivate composite e-commerce talents who possess both profound theoretical knowledge and practical operational capabilities [3].

3.2 Construction of School-Enterprise Collaborative Internet Operations Practice Teaching Base

The "Cross-border E-commerce Big Data Innovation Laboratory," a collaboration between a university and a leading cross-border e-commerce company, exemplifies the successful integration of industry and education to enhance e-commerce talent cultivation. This partnership involves shared responsibilities in program creation, curriculum optimization, and practical project development, leveraging real transaction data and platform tools from the enterprise, with the university overseeing educational design and implementation. Incorporating enterprise mentors as part-time faculty enriches the practical learning experience, focusing on big data and AI applications. This initiative has notably improved student outcomes: a 98% employment rate, 95% enterprise satisfaction, and a significant increase in students participating in data analysis competitions, demonstrating the initiative's effectiveness in meeting industry needs and fostering relevant skills[4]. See Table 1 for details.

Table 1. Comparison of Talent Cultivation Effects Before and After the Construction of School-Enterprise Collaborative Computer Practice Teaching Bases

Assessment Indicator	Before Base Construction	After Base Construction	Improvement
Student Employment Rate	92%	98%	6%
Enterprise Satisfaction Rate	85%	95%	10%
Student Award Rate	10%	42%	32%

3.3 Enhancement Plan for Collaborative Guidance Teachers' Internet Operations Abilities

To boost internet operations skills among collaborative guidance teachers in e-commerce education, a strategic plan is implemented focusing on practical exposure and expertise development. Key initiatives include sending teachers to companies for hands-on experience in cutting-edge technologies like big data and AI, hosting industry experts for on-campus workshops, and fostering mentorship pairings between educational and industry professionals[5]. Furthermore, e-commerce teaching skill contests, emphasizing technology integration, encourage innovative teaching methods. These efforts have shown significant success in enhancing teacher capabilities, benefiting students, and supporting collaborative education innovation.

4 EVALUATION OF INNOVATIVE PRACTICE EFFECTIVENESS AND MODEL OPTIMIZATION

4.1 Analysis of the Effectiveness of Internet Operations in Innovative Talent Cultivation

To evaluate the impact of collaborative education in e-commerce, we utilized novel data sources and analysis tools, including social media and consumer behavior data analysis, to assess students' learning behaviors and their internet operation skills. By analyzing students' e-commerce project performances in simulated markets, we gained insights into their market analysis abilities and strategic skills[6]. Advanced data analysis methods like machine learning and deep learning were employed to process large datasets and uncover patterns in skill enhancement. Results showed a significant improvement in students' programming proficiency, with an increase from an average score of 62 to 88 post-reform. Additionally, the number of provincial-level or higher awards won by students in competitions tripled, participation in real enterprise projects surged from 12% to 76%, and the project conversion rate exceeded the national average at 18%. Surveys indicated that 92% of graduates felt their improved practical internet operation skills were crucial for their career success, with employer satisfaction reaching 96%. These findings demonstrate the efficacy of the teaching reform in enhancing student competencies in programming, data analysis, and e-commerce, thereby validating the innovative approach to talent cultivation through internet operations. As shown in Figure 2.

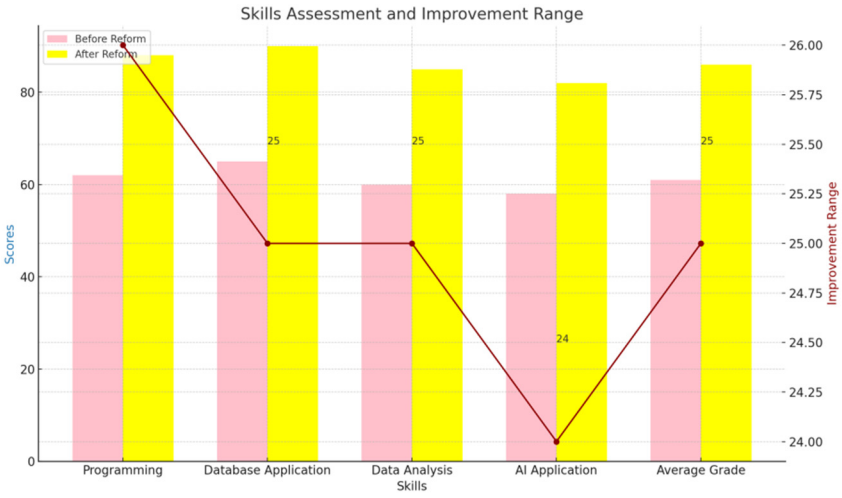

Fig. 2. Comparison of Student Computer Skill Assessment Scores

4.2 Construction of Collaborative Education Quality Assessment Indicator System

To ensure the enhancement of collaborative education practices, a multidimensional quality assessment indicator system was developed, rooted in principles of scientific rigor, comprehensiveness, and practicality. This system spans both quantitative and qualitative measures, focusing on goal attainment, process efficiency, resource allocation, and outcome feedback, with a special emphasis on the integration of internet technology skills[7]. Key indicators include advancements in students' computer proficiency and their involvement in technical projects, aimed at fostering well-rounded, innovative talents. Incorporating third-party and multi-perspective evaluations, the approach includes regular input from businesses, educators, and students, supported by in-depth data analysis. This framework not only addresses the shortcomings of traditional assessments but also offers a detailed, holistic view of collaborative education's impact, guiding continuous refinement and serving as a robust tool for diagnosing and improving educational practices. See Table 2 for details.

Table 2. Partial Quality Assessment Indicators for Innovative Practices in Collaborative Education in the E-commerce Major

Primary Indicator	Secondary Indicator	Evaluation Elements (Examples)
Goal Achievement	Talent Cultivation Quality	Student Employment Rate, Employment Quality, etc.
	Industry Service Capability	Enterprise Talent Acquisition Rate, Satisfaction, etc.

Process Implementation	Collaborative Education Mechanism	Integration of Production, Learning, Research, and Application, etc.
	Innovation Practice Effects	Student Participation in Projects, Awards, etc.
Condition Assurance	Faculty Team Construction	Proportion of Dual-Teacher Teachers, Participation of Industry Mentors, etc.
	Practice Platform Conditions	Proportion of Real Project Cases, Advanced Software and Hardware Equipment, etc.
Feedback on Outcomes	Enterprise Feedback	Suggestions for Talent Cultivation, etc.
	Student Feedback	Satisfaction Evaluation of Teaching Practices, etc.

4.3 Reflection on Issues and Continuous Optimization and Improvement of Models in Innovative Practices

Despite the successes in e-commerce education through collaborative innovation, challenges persist, such as the need for deeper technology-teaching integration and more forward-looking practical projects. Nearly half of participating enterprises cite a lack of engagement in educational activities, while mechanisms for regular, institutional collaboration require enhancement[8]. Additionally, a gap exists in students' practical engineering and interdisciplinary innovation skills. To bridge these gaps, continuous model refinement is essential: enhancing school-enterprise partnerships for timely tech updates, creating shared practical resource pools for broader access, and improving incentives for teaching innovation. Such systematic advancements aim to bolster collaborative education's effectiveness, aligning closely with evolving industry needs and elevating the preparedness of graduates for dynamic e-commerce environments [9].

5 CONCLUSION

Amidst a technological revolution, the demand for innovative talents in e-commerce necessitates novel collaborative education models between academia and industry. This study underscores the critical role of internet literacy and skills in shaping such talents, presenting an application framework that integrates internet technology across various educational stages. Through constructing collaborative platforms and enhancing faculty capabilities, the model has significantly improved students' tech application skills, industry competitiveness, and entrepreneurial capacities, aligning education with industry needs[10]. An assessment system further guides the continuous refinement of these practices. This approach not only advances talent cultivation in e-commerce but also serves as a blueprint for modernizing education to meet the demands of the new era, offering valuable insights for similar endeavors.

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