A Three-Dimensional Pathway for Enhancing Financial Literacy of Vocational Students: An Empirical Study Based on School-Government-Enterprise Collaboration

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Abstract. Enhancing financial literacy is crucial for cultivating competent professionals in the digital economy. This study investigates a "curriculum-training-collaboration" three-dimensional pathway to improve the financial literacy of vocational students majoring in Big Data Application for Taxation and Finance. Using a mixed-methods approach with 356 students, the study reveals that students' initial literacy was low (mean: 62.3/100), with notable deficiencies in financial behavior. Following a two-year intervention supported by the "Digital Intelligent Finance and Taxation Industry College" platform, students demonstrated significant improvements (post-test mean: 81.7, $p<0.001$). This study provides a replicable paradigm for vocational colleges to enhance financial literacy through industry-education integration.

Keywords: Financial Literacy; Industry-Education Integration; School-Government-Enterprise Collaboration; Big Data Education; Vocational Education

1 Introduction

With the advent of the digital economy era and the digital transformation of the finance and taxation industry, higher requirements have been placed on the comprehensive capabilities of vocational college graduates. Single technical skill training can no longer meet the urgent demand for compound talents in industrial development. Possessing good financial literacy has become an essential quality for technical and skilled talents in the new era [1].

Financial literacy refers to an individual's knowledge and understanding of financial concepts and risks, as well as the confidence and ability to use this knowledge and skills to make effective decisions [2]. It encompasses five core dimensions: income and consumption, savings and investment, risk and insurance, institutions and environment, and wealth and life [3]. Students majoring in Big Data Application for Taxation and Finance need not only to master professional skills such as data analysis and tax processing but also to possess scientific consumption concepts, rational investment ideas, and standardized financial behaviors.

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However, the current status of financial literacy among vocational students is concerning, with common issues including insufficient financial knowledge, irrational consumption behavior, and weak risk awareness [4]. Industry-education integration, as an important direction for vocational education reform [5], provides new pathways for enhancing students' financial literacy [6]. This study explores effective pathways for trilateral collaborative education involving schools, governments, and enterprises based on the Digital Intelligent Finance and Taxation Industry College platform.

2 Literature Review

2.1 Financial Literacy Education Research

International attention to financial literacy began in the early 21st century. In 2012, OECD first incorporated financial literacy assessment into PISA, defining it as "knowledge and understanding of financial concepts and financial risks, as well as the skills, motivation, and confidence to apply this knowledge" [7]. In 2020, OECD released new PISA financial literacy assessment results, further emphasizing its important role in addressing economic uncertainty [8]. Domestic research has also deepened, with scholars revealing the overall level and group differences in Chinese citizens' financial literacy [4, 9]. Research specifically targeting vocational students' financial literacy has further highlighted persistent gaps in financial behavior and career-related competencies within this population [10, 11].

2.2 Industry-Education Integration

Industry-education integration is an important direction for vocational education reform in China. Industry colleges, as important carriers, have developed rapidly in recent years [12-14]. However, existing research has paid insufficient attention to specific pathways for financial literacy cultivation, and research on trilateral collaborative education mechanisms is not yet mature.

3 Research Methodology

3.1 Research Design

This study adopted a mixed-methods research design, combining quantitative questionnaire surveys and qualitative in-depth interviews. The research was conducted from September 2023 to December 2025 at Guangxi Technology and Business Vocational College, with research subjects being current students majoring in Big Data Application for Taxation and Finance.

3.2 Research Instruments

The Financial Literacy Assessment Scale used in this study was developed based on China's Financial Literacy Education Standards Framework. The scale includes five dimensions with 45 items, using a 5-point Likert scale. Reliability testing showed an overall Cronbach's α coefficient of 0.872. Table 1 shows the dimensional structure.

Table 1. Dimensional Structure of the Financial Literacy Assessment Scale

Dimension	Core Content	Items	Reference
Financial Knowledge	Income, consumption, savings, investment, risk knowledge	10	OECD PISA
Financial Attitude	Emphasis and value orientation toward financial issues	8	China Framework
Financial Behavior	Daily consumption, savings, financial management practices	9	Xin et al.
Financial Skills	Financial planning, risk assessment, information acquisition	10	OECD PISA
Career Competencies	Financial decision-making in professional scenarios	8	China Framework

3.3 Data Collection

Quantitative data were collected through online questionnaires with 356 valid responses (89.0% recovery rate). Sample characteristics are shown in Table 2. Qualitative data were collected through semi-structured interviews with 15 participants. "The post-test was administered immediately upon the conclusion of the two-year intervention (December 2025) to evaluate the immediate effectiveness of the pathway."

Table 2. Sample Characteristics of Survey Participants (N=356)

Characteristic	Category	n (%)
Gender	Male	168 (47.2%)
	Female	188 (52.8%)
Grade	First Year	142 (39.9%)
	Second Year	126 (35.4%)
	Third Year	88 (24.7%)
Prior Financial Courses	Yes	103 (28.9%)
	No	253 (71.1%)

4 Results

4.1 Current Status Analysis

Survey results showed that students' overall financial literacy level was relatively low. Table 3 presents the scores for five dimensions. The overall mean score was 62.3 (out of 100), below the national benchmark of 75 [4]. Financial Attitude scored highest (71.2), while Financial Behavior scored lowest (55.8).

Table 3. Pre-test Financial Literacy Scores Across Five Dimensions

Dimension	Mean (SD)	Range	Below 75%
Financial Knowledge	68.4 (12.3)	0-100	58.4%
Financial Attitude	71.2 (10.8)	0-100	45.2%
Financial Behavior	55.8 (14.6)	0-100	72.5%
Financial Skills	59.7 (13.2)	0-100	68.8%
Career Competencies	56.4 (15.1)	0-100	70.2%
Overall Literacy	62.3 (11.7)	0-100	64.9%

4.2 Influencing Factors

Regression analysis identified three significant predictive variables: financial course learning experience ($\beta = 0.32$, $p<0.001$), school-enterprise cooperation practice ($\beta = 0.24$, $p<0.001$), and family educational background ($\beta = 0.18$, $p<0.01$). School-enterprise cooperation had a particularly prominent impact on financial behavior and career-related competencies.

5 Three-Dimensional Pathway Construction

"Based on the analysis, this study constructed a three-dimensional integrated pathway of 'curriculum integration-practical training-collaborative education,' anchored by the Digital Intelligent Finance and Taxation Industry College platform. This industry college functions as a mixed-ownership collaborative entity co-constructed by the vocational college and leading enterprises, operating under government policy guidance. Distinct from traditional internship bases, the platform integrates advanced digital tools to simulate real-world financial scenarios. Specifically, it deploys AI-powered tax advisory simulators utilizing Natural Language Processing (NLP) to train students in taxpayer service interactions, and a Golden Tax System (Phase IV) emulation cloud that allows students to practice authentic tax filing and risk control workflows. Furthermore, Optical Character Recognition (OCR) technology is embedded in the 'Real Accounts'

module to automate invoice processing, requiring students to focus on data verification and financial decision-making logic rather than manual entry."

Figure 1 illustrates the conceptual framework.

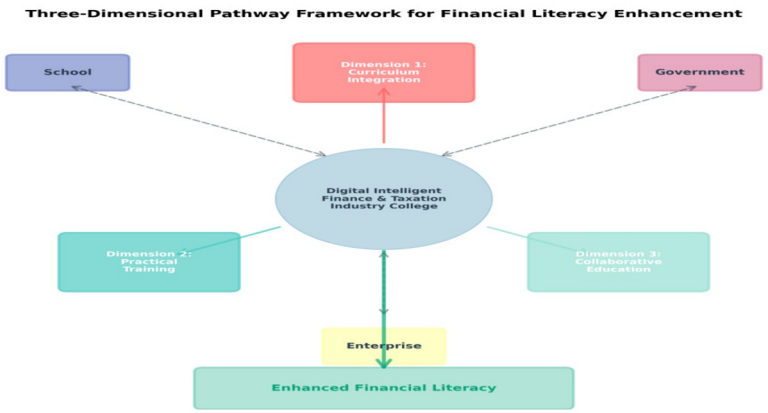

Fig. 1. Three-Dimensional Pathway Framework for Financial Literacy Enhancement

5.1 Dimension 1: Curriculum Integration

Curriculum integration serves as the foundational project. This study constructed a progressive three-tier system termed "Foundation-Integration-Application" to embed financial literacy throughout the talent cultivation process. Specifically, the Foundation tier (Year 1) builds basic awareness through courses such as Accounting Fundamentals, Economics, and Tax Law. The Integration tier (Year 2) focuses on developing professional capabilities via Tax Accounting, Risk Prevention, Tax Inspection, and enterprise practice. Finally, the Application tier (Year 3) culminates in comprehensive application through enterprise internships, bridging the gap between theory and practice

5.2 Dimension 2: Practical Training

Practical training is a key component. This study constructed a dual-tier practice system of "on-campus-off-campus" practice. Through the "Real Accounts on Campus" model, real enterprise business was introduced into training, enabling students to complete authentic business processing under guidance, realizing "learning by doing."

5.3 Dimension 3: Collaborative Education

The collaborative education mechanism is the institutional foundation. This study constructed a three-in-one mechanism of "organizational-resource-evaluation collaboration." The platform was co-constructed following established industry college frameworks [12]. Table 4 shows key collaborative partnerships.

Table 4. Key Collaborative Partnerships in the School-Government-Enterprise Mechanism

Partner Type	Organizations	Cultivation Focus
Government	Nanning Tax Bureau	Tax policy, taxpayer services
Consulting Firms	Guangxi Sujia Group, Budao Tianxia	Bookkeeping, tax planning, consulting
Other Enterprises	Guangxi Chengmi Business Consulting	Financial management, professional experience

6 Implementation Effects

6.1 Quantitative Assessment

After two years of practice (November 2023 to December 2025), post-test assessment showed significant improvements across all dimensions, as shown in Table 5 and Figure 2.

Table 5. Pre-test and Post-test Comparison of Financial Literacy Scores Across Five Dimensions

Dimension	Pre-test	Post-test	Δ	P-value
Financial Knowledge	68.4 (12.3)	85.2 (9.7)	+16.8	<0.001***
Financial Attitude	71.2 (10.8)	88.4 (7.2)	+17.2	<0.001***
Financial Behavior	55.8 (14.6)	76.9 (11.3)	+21.1	<0.001***
Financial Skills	59.7 (13.2)	82.1 (10.5)	+22.4	<0.001***
Career Competencies	56.4 (15.1)	80.8 (9.8)	+24.4	<0.001***
Overall Literacy	62.3 (11.7)	81.7 (8.4)	+19.4	<0.001***

Paired-sample t-test results showed students' overall financial literacy score improved from 62.3 to 81.7, an increase of 19.4 points ($t = 28.67$, $p<0.001$), exceeding the national benchmark of 75. Dimensional improvements ranged from 16.8 to 24.4 points, with Career-Related Competencies showing the most significant improvement.

Additionally, 78.3% of students self-reported significant improvement in financial decision-making abilities, and 82.6% felt more confident in managing personal and professional financial affairs. The 1+X certificate examination pass rate reached 97.3%, 19.2 percentage points higher than non-participating students.

"A deeper analysis of the subscale improvements reveals distinct correlations between specific intervention pathways and literacy dimensions. The 'Curriculum Integration' pathway primarily contributed to the significant rise in Financial Knowledge (+16.8), as the systematic embedding of tax law and economics courses reinforced theoretical foundations. Conversely, the most substantial gains observed in Career-Related Competencies (+24.4) and Financial Skills (+22.4) are largely attributable to the 'Practical Training' dimension, specifically the 'Real Accounts on Campus' model. While theoretical coursework improved awareness, it was the hands-on exposure to real enterprise business processing that effectively transformed students' Financial Behavior (+21.1), shifting them from passive knowledge recipients to active, rational financial decision-makers."

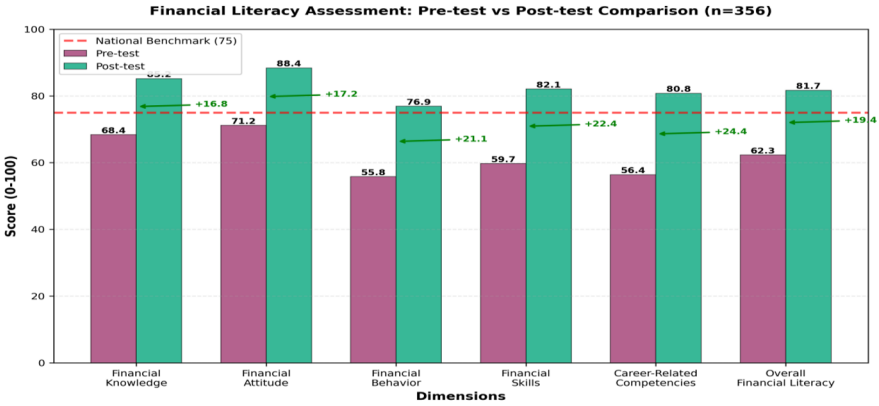

Fig. 2. Financial Literacy Assessment: Pre-test vs Post-test Comparison

6.2 Qualitative Assessment

Through thematic analysis of interview data, four core themes emerged: (1) value recognition of financial literacy education - students universally recognized its importance; (2) supporting role of the Industry College platform - teachers believed it provided tangible basis for cooperation; (3) practical value of "Real Accounts on Campus" - students found productive practice most rewarding; (4) effectiveness of trilateral collaboration - the mechanism effectively integrated resources from all parties.

7 Conclusions and Recommendations

7.1 Research Conclusions

This study yields three main conclusions: First, vocational students' overall financial literacy level is low with significant room for improvement, particularly in financial behavior and career-related competencies. Second, the three-dimensional pathway sup-

ported by the Industry College platform significantly improved students' financial literacy (19.4-point improvement, $p<0.001$), validating trilateral collaborative education effectiveness. Third, the "Real Accounts on Campus" productive practice model plays a key role in enhancing financial literacy by facilitating knowledge-to-ability transformation.

7.2 Policy Recommendations

Based on findings, we recommend: For schools, leverage the Industry College platform, improve cooperation council mechanisms, optimize the three-tier curriculum system, and expand "Real Accounts on Campus" coverage. For governments, increase policy support and financial investment, facilitate resource sharing platforms. For enterprises, actively participate in Industry College construction, provide real business resources and internship opportunities, and deploy experts as enterprise mentors.

7.3 Limitations and Future Research

Limitations include the single-site, one-group pre-post design without a control group, and the absence of longitudinal follow-up to assess long-term retention. Future work should validate replicability across multiple institutions, incorporate longitudinal tracking, and further explore digital technologies (e.g., AI simulations) to enhance pedagogical precision.

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