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Guidelines for Enhancing the Work-Based Learning Model at Beijing Automotive Technician College

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Abstract: The objectives of this research were: 1. To investigate the actual operation status of the four-dimensional Work-Based Learning Model implemented at Beijing Automotive Technician College based on full-time teachers' feedback. 2. To formulate localized, operable optimization guidelines for the college's Work-Based Learning teaching system by combining quantitative questionnaire data and qualitative expert interview records. Simple random sampling was adopted to select 132 full-time teachers from a total population of 197 teachers as questionnaire respondents. The research tools contained a 24-item 5-point Likert scale covering four core Work-Based Learning dimensions and a semi-structured interview outline. Statistical methods including frequency percentage, mean (M), standard deviation (S.D.), reliability test and thematic content analysis were adopted for data processing. The results indicated that the overall implementation level of the college's Work-Based Learning Model reached a high level. Ranked by mean value from high to low, the four dimensions were curriculum-post matching degree, teachers' integrated teaching ability, school-enterprise cooperation level and practical training resource guarantee conditions (the lowest dimension). Corresponding operable improvement guidelines were summarized from expert interviews, covering curriculum mechanism optimization, deepened industry-education integration, standardized teacher enterprise training and phased upgrading of training resources.

Keywords: Work-Based Learning Model, Technician College, Industry-Education Integration, Teaching Optimization

1. Introduction

In recent years, China's central government, Ministry of Education and Ministry of Human Resources and Social Security have issued successive national policies to boost high-quality vocational education, taking Work-Based Learning as the core reform of technical colleges. The revised Vocational Education Law of the People's Republic of China clearly demands the integration of classroom theoretical teaching and systematic on-site enterprise training. National medium- and long-term vocational education plans all regard school-enterprise deep integration as the core task of teaching reform. Driven by electrification and intelligent upgrading of automobile and high-end equipment industries, traditional separated theory-practice teaching has exposed prominent defects in technical colleges, such as dislocated curriculum and enterprise posts, superficial internship cooperation, insufficient regular enterprise training channels for teachers and aging training hardware and software. As a public technician college focusing on automobile majors, Beijing Automotive Technician College has carried out preliminary pilot practice relying on long-term school-enterprise cooperative resources, yet multiple restrictive bottlenecks still hinder the systematic promotion of integrated teaching reform based on Work-Based Learning. After sorting and frequency statistics of 31 domestic documents recording the practice of Work-Based Learning, four core supporting dimensions are extracted: curriculum-post matching degree, school-enterprise cooperation level, teachers' integrated teaching ability and practical training resource guarantee conditions. Existing relevant research has three obvious deficiencies. First, most scholars only conduct single-dimensional analysis of Work-Based Learning and fail to build a systematic four-dimensional evaluation framework for multi-major comprehensive technician colleges. Second, most empirical research selects students as research objects, while few studies take frontline full-time teachers (the actual implementers of Work-Based Learning reform) as respondents. Third, targeted empirical research focusing on automobile technician colleges in Beijing is still scarce. This research fills the above research gaps through mixed quantitative and qualitative research design.

2. Research Objective

1) Study the current situation of the use of work-based learning models at Beijing Automotive Technical College.

2) Provide guidelines for enhancing the work-based learning model at Beijing automotive technician college.

3. Literature Review

3.1 Definition of Work-Based Learning

Work-Based Learning is a competency-oriented talent cultivation mode that organically integrates campus theoretical teaching and enterprise on-site practical training (Akkerman & Bakker, 2012). Different from the traditional teaching mode that separates theoretical knowledge and practical operation, all curriculum modules and training projects are designed centering on real enterprise production procedures, so as to eliminate the gap between classroom learning and actual workplace demands. Billett (2014) pointed out that on-the-job practical participation is the core carrier for students to form standardized vocational operation skills under the framework of Work-Based Learning. By sorting 31 domestic documents about the practice of Work-Based Learning and carrying out indicator frequency statistics, four core supporting dimensions are extracted, whose occurrence frequency from high to low is curriculum-post matching degree, school-enterprise cooperation level, teachers' integrated teaching ability and practical training resource guarantee conditions. Domestic scholar Zhao Zhiqun (2014) constructed a localized implementation framework of Work-Based Learning suitable for Chinese technical colleges, and pointed out that the separation of teaching content and enterprise production practice is a common practical problem of domestic automobile vocational schools.

3.2 Theoretical Basis of Four Core Dimensions

3.2.1 Curriculum-post matching degree.

Based on Spady's Outcome-Based Education Theory (1994), vocational curriculum design should take enterprise post competency standards as the core logic rather than disciplinary knowledge, which is the basic premise of effective Work-Based Learning implementation. Most domestic technical colleges adopt fixed multi-year curriculum revision cycles, which cannot keep pace with the rapid iteration of new energy vehicle and intelligent equipment technologies, resulting in disconnection between curriculum and posts (Zhang Ying, 2021). High curriculum-post matching degree can effectively shorten graduates' post adaptation cycle after employment and improve the overall effect of Work-Based Learning.

3.2.2 School-enterprise cooperation level.

Based on Freeman's Stakeholder Theory (1984), vocational colleges and industrial enterprises are two core stakeholders in talent cultivation required by Work-Based Learning. At present, most domestic technical colleges lack long-term benefit-sharing and risk-sharing mechanisms, and only carry out simple short-term internship without joint curriculum development, which restricts the in-depth implementation of Work-Based Learning (Liu Yang, 2020).

3.2.3 Teachers' integrated teaching ability.

Frontline enterprise practical experience is the basic premise of integrated teaching under Work-Based Learning. Teachers without long-term factory practice cannot integrate real enterprise fault cases into daily courses to support the development of Work-Based Learning. Mandatory annual enterprise rotation training and standardized dual-qualified teacher assessment are the core paths to improve teachers' comprehensive teaching capacity for Work-Based Learning (Zhao Zhiqun, 2022).

3.2.4 Practical Training Resource Guarantee Conditions

Based on Barney's Resource-Based View (1991), complete synchronous training hardware and software are the basic material guarantee for the smooth operation of Work-Based Learning. Insufficient special renewal funds lead to widespread aging training equipment, which cannot restore real enterprise production scenarios and reduce the teaching effect of Work-Based Learning (Li Jianfeng, 2022).

3.3 Research Framework Construction

After sorting out 31 complete domestic documents recording the practice of Work-Based Learning and counting the frequency of all evaluation indicators, the four dimensions with the highest occurrence frequency are selected as the core research framework: curriculum-post matching degree, school-enterprise cooperation level, teachers' integrated teaching ability and practical training resource guarantee conditions. The four dimensions cover the whole talent training chain of Work-Based Learning and form a complete measurement system applicable to multi-major automobile technician colleges, filling the research gap of single-dimensional analysis in existing literatures. Figure 3.1 presents the four-dimensional research framework of this paper.

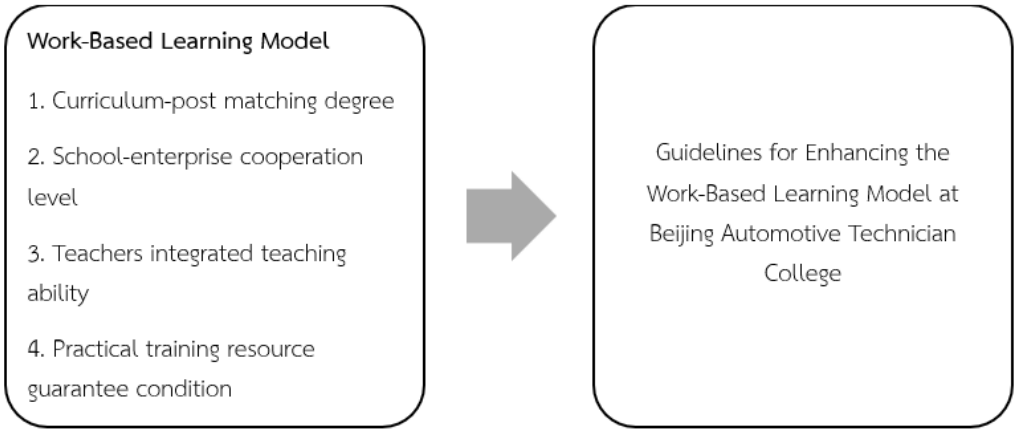

Figure 3.1: Research Framework

4. Research Methodology

4.1 The Population and Sample Group

The research population consists of 197 full-time teachers covering six departments of Beijing Automotive Technician College, namely Intelligent Manufacturing Department, Automotive Engineering Department, Numerical Control Technology Department, Digital Business Department, Academic Affairs Office and Training Center. Referring to Krejcie and Morgan's sampling table (1970), simple random sampling is adopted to select 132 full-time teachers as questionnaire respondents for investigating the current status of Work-Based Learning.

Table 4.1: Faculty-wise Population and Sample Distribution

Faculty Name	The Population	The Sample Group
Intelligent Manufacturing Department	38	26
Automotive Engineering Department	47	32
Numerical Control Technology Department	35	23
Digital Business Department	39	26
Academic Affairs Office	15	10
Training Center	23	15
total	**197**	**132**

According to Table 4.1, the final sample included 132 teachers selected from different academic units of Beijing Automotive Technician College. These participants represented the Intelligent Manufacturing Department, Automotive Engineering Department, Numerical Control Technology Department, Digital Business Department, Academic Affairs Office, and Training Center, thereby ensuring that all major departments were adequately represented.

For qualitative research, purposive sampling was adopted to select five experts with more than 10 years of vocational teaching and management experience to carry out one-on-one semi-structured interviews.

4.2 Research Instrument

The instrument to collect the data for objective one was 5-point rating scale questionnaire. The questionnaire was divided into three parts, including personal information, WBL current situation scale and open-ended suggestion questions. Three experts examined the IOC of this questionnaire, with IOC value ranged from 0.67 to 1.00. The reliability coefficient Cronbach's Alpha of this scale was 0.83.

Table 4.2: Reliability statistics of professional development scale

Cronbach's Alpha	Number of items
0.83	24

Semi-structured open-ended interview outline was adopted for the second research objective, which was designed around four core dimensions of WBL model.

4.3 Data Collection

Electronic questionnaires targeting Work-Based Learning investigation were distributed to all sampled teachers from June to July 2026, and all valid questionnaires were collected within 15 days. One-on-one offline and online interviews were scheduled with five experts respectively to collect qualitative data for formulating Work-Based Learning optimization guidelines.

4.4 Data Analysis

The personal information data of respondents are analyzed by frequency and percentage. The four-dimensional measurement data of Work-Based Learning are analyzed by mean and standard deviation. The interview transcripts for Work-Based Learning improvement suggestions are processed by thematic content analysis.

5. Research Results

5.1 Symbol and Abbreviations

n = Sample group
M = Mean
S.D. = Standard deviation

5.2 Presentation of Data Analysis

Objective 1: Analyze the demographic information and four-dimensional operation level of college WBL model via questionnaire data.
Objective 2: Summarize operable enhancement guidelines based on interview records.

5.3 Results of Data Analysis

5.3.1 Demographic Information of Respondents

Table 5.1: Demographic Information of Respondents

(n=132)

	Personal Information	Frequency	Percentage
Gender	Male	71	53.8
	Female	61	46.2
	Total	132	100
Age	22-30 years old	14	10.6
	31-35 years old	36	27.3
	36-40 years old	29	22.0
	41-45 years old	36	27.3
	Over 45 years	17	12.9
	Total	132	100
Working years	Less than 5 years	14	10.6
	5-10 years	37	28.0
	More than 10 years	81	61.4
	Total	132	100

According to Table 5.1, in terms of gender distribution, male teachers account for the largest proportion at 53.8%, while female teachers account for 46.2%. In terms of age composition, teachers aged 31–35 and 41–45 both account for 27.3%, ranking the highest among all age groups, followed by teachers aged 36–40 at 22.0%. Teachers over 45 years old account for 12.9%, and teachers aged 22–30 take up the smallest proportion of 10.6%. Regarding working years, up to 61.4% of respondents have more than 10 years of teaching experience, 28.0% have 5–10 years of working experience, and only 10.6% have less than 5 years of service.

5.3.2 Overall Mean Ranking of Four Dimensions

Table 5.2: Mean and Standard deviation of Work-Based Learning Model in four Dimensions

No.	Dimensions	M	S.D.	Level	Ranking
1	Curriculum-post matching degree	4.58	0.54	Highest	1
2	School-enterprise cooperation level	4.24	0.60	High	3
3	Teachers' integrated teaching ability	4.44	0.54	High	2
4	Practical training resource guarantee conditions	4.08	0.60	High	4
Total		**4.34**	**0.60**	**High**	

According to Table 5.2, found that the overall current situation of the work-based learning teaching mode in Beijing Automotive Technician College was at a high level (M= 4.34, S.D. = 0.60). Considering the results from the highest to the lowest mean were as follows: the highest mean was curriculum-post matching degree (M= 4.58, S.D. = 0.54), followed by teachers' integrated teaching ability (M= 4.44, S.D. = 0.54), school-enterprise cooperation level (M= 4.24, S.D. = 0.60), and practical training resource guarantee conditions was the lowest mean (M= 4.08, S.D. = 0.60).

Table 5.3: Mean and Standard deviation of Work-Based Learning Model in curriculum-post matching degree

(n = 132)

No.	Curriculum-post matching degree	M	S.D.	Level	Ranking
1	The professional courses offered by the college fit the competency requirements of enterprise technical posts.	4.65	0.47	Highest	1
2	Teaching contents can be updated timely according to industrial development and post iteration.	4.48	0.58	High	6
3	The curriculum system covers all core skill points required by enterprise employment posts.	4.65	0.47	Highest	2
4	Theoretical teaching contents are highly consistent with on-site post operation standards.	4.56	0.58	Highest	4
5	Training projects in courses conform to real working scenarios of enterprises.	4.56	0.58	Highest	5
6	Curriculum design fully considers employees' career development paths in enterprises.	4.57	0.51	Highest	3
	Total	**4.58**	**0.54**	**Highest**	

According to Table 5.3, found that the current situation of curriculum-post matching degree was at the highest level (M= 4.58, S.D. = 0.54). Considering the results from the highest to the lowest mean were as follows: the highest mean was the professional courses offered by the college fit the competency requirements of enterprise technical posts (M= 4.65, S.D. = 0.47), followed by the curriculum system covers all core skill points required by enterprise employment posts (M= 4.65, S.D. = 0.47), curriculum design fully considers employees' career development paths in enterprises (M= 4.57, S.D. = 0.51), theoretical teaching contents are highly consistent with on-site post operation standards (M= 4.56, S.D. = 0.58), training projects in courses conform to real working scenarios of enterprises (M= 4.56, S.D. = 0.58), teaching contents can be updated timely according to industrial development and post iteration was the lowest mean (M= 4.48, S.D. = 0.58).

Table 5.4: Mean and Standard deviation of Work-Based Learning Model in School-enterprise cooperation level

(n = 132)

No.	School-enterprise cooperation level	M	S.D.	Level	Ranking
1	The college maintains long-term and stable cooperative relations with local industrial enterprises.	4.32	0.58	High	1
2	Cooperative enterprises actively participate in college curriculum formulation and teaching reform.	4.16	0.61	High	5
3	Enterprises provide standardized post training positions and teaching resources for teachers and students.	4.31	0.58	High	3
4	The benefit-sharing and operation mechanism of school-enterprise cooperation is complete and operable.	4.17	0.62	High	4
5	Enterprise instructors regularly enter the college to carry out practical training guidance.	4.16	0.61	High	6
6	The existing school-enterprise cooperation mode can effectively support the implementation of WBL teaching.	4.32	0.58	High	2
	Total	4.24	0.60	High	

According to Table 5.4, found that the current situation of school-enterprise cooperation level was at a high level (M= 4.24, S.D. = 0.60). Considering the results from the highest to the lowest mean were as follows: the highest mean was the college maintains long-term and stable cooperative relations with local industrial enterprises (M= 4.32, S.D. = 0.58), followed by the existing school-enterprise cooperation mode can effectively support the implementation of WBL teaching (M= 4.32, S.D. = 0.58), enterprises provide standardized post training positions and teaching resources for teachers and students (M= 4.31, S.D. = 0.58), the benefit-sharing

and operation mechanism of school-enterprise cooperation is complete and operable (M = 4.17, S.D. = 0.62), cooperative enterprises actively participate in college curriculum formulation and teaching reform (M= 4.16, S.D. = 0.61), enterprise instructors regularly enter the college to carry out practical training guidance was the lowest mean (M= 4.16, S.D. = 0.61).

Table 5.5: Mean and Standard deviation of Work-Based Learning Model in teachers' integrated teaching ability

(n = 132)

No.	Teachers' integrated teaching ability	M	S.D.	Level	Ranking
1	Teachers possess solid professional theories and enterprise practical operation capabilities.	4.51	0.51	High	1
2	Teachers can integrate real enterprise post cases into daily professional teaching.	4.46	0.51	High	4
3	Teachers can adjust teaching methods accurately according to post competency standards.	4.49	0.51	High	2
4	Teachers actively take part in enterprise training to upgrade professional skills.	4.29	0.60	High	6
5	Teachers are competent for integrated theoretical and practical teaching under the WBL Model.	4.47	0.51	High	3
6	Teachers can effectively solve practical operation problems in students' post training.	4.44	0.55	High	5
	Total	**4.44**	**0.54**	**High**	

According to Table 5.5, found that the current situation of teachers' integrated teaching ability was at a high level (M= 4.44, S.D. = 0.54). Considering the results from the highest to the lowest mean were as follows: the highest mean was teachers possess solid professional theories and enterprise practical operation capabilities (M= 4.51, S.D. = 0.51), followed by teachers can adjust teaching methods accurately according to post competency standards (M= 4.49, S.D. = 0.51), teachers are competent for integrated theoretical and practical teaching under the WBL Model (M= 4.47, S.D. = 0.51), teachers can integrate real enterprise post cases into daily professional teaching (M= 4.46, S.D. = 0.51), teachers can effectively solve practical operation problems in students' post training (M= 4.44, S.D. = 0.55), teachers actively take part in enterprise training to upgrade professional skills was the lowest mean (M= 4.29, S.D. = 0.60).

Table 5.6: Mean and Standard deviation of Work-Based Learning Model in practical training resource guarantee conditions

(n = 132)

No.	Practical training resource guarantee conditions	M	S.D.	Level	Ranking
1	The college's training equipment is complete and consistent with enterprise industrial equipment standards.	3.86	0.63	High	6
2	The college updates and maintains training teaching equipment and resources regularly.	3.90	0.62	High	5
3	The college owns sufficient professional training venues and post simulation scenes.	4.17	0.55	High	4
4	The college has complete software supports such as teaching platforms and course resources.	4.18	0.55	High	3
5	Current training resource allocation can satisfy the needs of WBL teaching activities.	4.18	0.54	High	1
6	The college establishes a sound management and operation system for practical training resources.	4.18	0.61	High	2
	Total	4.08	0.60	High	

According to Table 5.6, practical training resource guarantee conditions achieved a high level (M=4.08, S.D.=0.60). Three sub-indicators shared the top mean of M=4.18: training resource allocation meeting WBL teaching needs (S.D.=0.54), sound management-operation system for practical training resources (S.D.=0.61), and complete software supports including teaching platforms and course resources (S.D.=0.55). Next came sufficient professional training venues and post-simulation scenes (M=4.17, S.D.=0.55), regular updating and

maintenance of training equipment and resources (M=3.90, S.D.=0.62). The lowest score was observed for training equipment completeness and its consistency with enterprise industrial standards (M=3.86, S.D.=0.63).

5.4 Interview Analysis Results

The five interviewed experts all hold a master's degree or above and possess more than 10 years of vocational school management and teaching experience. A total of 36 targeted improvement suggestions covering the four core dimensions were collected, sorted, and summarized from the full interview records of these five experts. All interview viewpoints fully verify the four major restrictive bottlenecks reflected in the quantitative questionnaire data. Classified operable optimization guidelines are extracted from these 36 integrated pieces of advice, which provide a solid qualitative basis for constructing the improvement system of the Work-Based Learning Model. Below are the interview analysis results for the four dimensions.

5.4.1 Guidelines for improving curriculum-post matching degree

From the interviews, experts put forward suggestions on curriculum-post matching. They suggested building a dynamic multi-major curriculum-post matching system to synchronously update teaching content in response to industrial technical iteration and narrow the gap between course settings and enterprise post competency standards. It is necessary to establish an enterprise post competency database and develop classified modular courses for different majors under the guidance of enterprise competency requirements. Colleges should also implement quarterly joint curriculum reviews with enterprises and dynamically adjust curriculum priorities according to survey results of graduates' post competency.

5.4.2 Guidelines for improving school-enterprise cooperation level

Regarding school-enterprise cooperation, the interviewed experts offered relevant optimization proposals. Colleges should expand multi-field school-enterprise cooperation frameworks, improve long-term benefit-sharing mechanisms, and realize in-depth full-cycle integration of industry and education. Multi-year strategic cooperation agreements shall be signed, with joint curriculum development and training base co-construction included in formal cooperation clauses. Meanwhile, two-way teacher-technician exchange channels need to be constructed, and regular screening and evaluation for cooperative enterprises should be carried out.

5.4.3 Guidelines for improving teachers' integrated teaching competence

In terms of teachers' integrated teaching competence, several measures were summarized from expert interviews. Standardized categorized training mechanisms should be developed for faculty, and school-enterprise mentor matching channels should be set up to comprehensively enhance teachers' integrated teaching competence. Full-time teachers are required to participate in annual front-line practice in enterprises and receive categorized high-level industry skill training. Enterprise practice performance and integrated teaching effect shall be adopted as core assessment indicators for dual-qualified teachers.

5.4.4 Guidelines for improving practical training resource guarantee conditions

Experts also shared their views concerning practical training resource guarantee conditions. Colleges shall complete synchronous upgrading and standardized daily management of various practical training hardware and software to address bottlenecks caused by outdated and insufficient training resources. Special vocational education funds can be applied for batch equipment renewal, and enterprise equipment leasing and sharing can be adopted to make up for the shortage of high-end hardware resources. A unified college-level training resource platform should be built, and regular inventory and maintenance systems for training facilities need to be formulated.

6. Conclusion Discussion and Recommendations

6.1 Core Research Conclusions

The core research findings are summarized as follows:

First, the overall implementation of the four-dimensional Work-Based Learning Model at Beijing Automotive Technician College reaches a high level, yet unbalanced development exists among the four core evaluation dimensions.

Second, when ranking the four dimensions by average score from high to low, the order is curriculum-post matching degree (highest), teachers' integrated teaching ability, school-enterprise cooperation level, and practical training resource guarantee conditions (lowest across all dimensions). In terms of curriculum-post matching degree, the college's curriculum system basically matches enterprise post competency standards, but the fixed long revision cycle leads to slow update of teaching content, which cannot keep pace

with the iteration of new energy vehicle and intelligent manufacturing technologies. For teachers' integrated teaching ability, most teachers possess solid theoretical and practical skills, while the lack of mandatory annual enterprise rotation training becomes the main weakness. Regarding school-enterprise cooperation level, long-term enterprise partnerships have been established, yet cooperation only stays at simple internships without joint curriculum development and regular off-campus tutor guidance. As for practical training resource guarantee conditions, complete training venues and teaching platforms are available, but training equipment lags behind enterprise industrial standards due to insufficient special renewal funds, which forms the core bottleneck of teaching reform. Through semi-structured interviews with five vocational education experts, targeted four-dimensional optimization guidelines are extracted, which can solve the four major restrictive weaknesses reflected in the questionnaire data.

6.2 Discussion

6.2.1 Overall Analysis of the Work-Based Learning Model

The college has built a complete Work-Based Learning operation system covering curriculum design, teacher training, school-enterprise collaboration and training resources, and the overall implementation effect is positive. The unbalanced dimensional development mainly results from the college's long-term resource allocation tendency: the school has invested heavily in curriculum construction and teacher training, while lacking long-term institutional guarantee for deep school-enterprise cooperation and continuous training fund input. This research conclusion is consistent with Wu (2025), who pointed out unbalanced dimensional development is a universal problem of Work-Based Learning construction in domestic vocational colleges; multiple scholars also confirm that insufficient enterprise participation and limited training funds are the main restricting factors of integrated teaching reform.

6.2.2 Discussion on Curriculum-post Matching Degree

This dimension ranks first, because the college always takes enterprise post competency as the core logic of curriculum design, which conforms to Spady's Outcome-Based Education Theory (1994). However, without quarterly joint review mechanisms with enterprises, teaching content cannot keep up with industrial technological iteration, making the timely update indicator the lowest within this dimension. This finding matches Jiang Deping (2022), who states delayed curriculum updating is a common defect of domestic automobile technician colleges.

6.2.3 Discussion on Teachers' Integrated Teaching Ability

This dimension ranks second. Teachers accumulate abundant classroom teaching experience, but the absence of standardized mandatory enterprise practice rules leads to insufficient real production case reserves, restricting integrated teaching quality. The view of Billett (2015) supports this result: long-term frontline enterprise practice is the foundation of vocational teachers' comprehensive teaching capacity; Zhao Zhiqun (2022) also emphasizes regular factory rotation as an essential training path for dual-qualified teachers. Different from most previous student-centered research, this paper adopts teacher samples and supplements the research blank in this field.

6.2.4 Discussion on School-enterprise Cooperation Level

The college maintains stable cooperative relations with local enterprises, yet all cooperation adopts short-term internship contracts without complete benefit-sharing mechanisms, resulting in low enterprise enthusiasm to participate in curriculum development and regular teaching guidance. This result coincides with Zhao Bin (2022) and Liu Yang (2021), whose studies prove incomplete interest distribution systems lead to superficial school-enterprise cooperation in most technical colleges.

6.2.5 Discussion on Practical Training Resource Guarantee Conditions

This dimension scores the lowest among the four dimensions, mainly restricted by inadequate annual special equipment renewal funds. Training hardware cannot synchronize with enterprise mainstream equipment standards, which directly reduces the authenticity of Work-Based practical teaching. This view is verified by Li Jianfeng (2022) and Zhou Jian & Wang Hui (2022), whose field surveys confirm aging training equipment is the primary bottleneck of vocational colleges' practical teaching.

6.2.6 Discussion on the Formulated Optimization Guidelines

All improvement guidelines summarized from expert interviews target the weak indicators of each evaluation dimension, constructing a complete closed-loop optimization system covering curriculum setting, teachers' development, school-enterprise cooperation, and practical training resources. First, the proposed

dynamic curriculum adjustment rules effectively solve the problem of outdated teaching content, which is consistent with the research conclusions of Pan Haisheng et al. (2026). Second, the established multi-year strategic cooperation mechanisms break the long-standing dilemma of school-enterprise cooperation limited to simple internships, which aligns with Xu Guoqing's (2025) research on school-enterprise interest linkage. Third, the formulated mandatory enterprise training systems help comprehensively improve teachers' practical teaching ability, corresponding to Zhao Zhiqun's (2023) research on the cultivation of dual-qualified teachers. Fourth, the batch replacement of training equipment supported by special vocational education funds resolves the problem of aging and backward hardware facilities, which is strongly supported by Ping Heguang's (2026) research on the operational management of vocational training resources.

6.3 Targeted Optimization Recommendations

This study proposes four targeted optimization recommendations to improve the overall implementation quality of the Work-Based Learning model. First, in terms of curriculum optimization, cross-department curriculum groups composed of professional teachers and enterprise technicians should be established to implement quarterly curriculum revision and supplement skill modules concerning new energy vehicles and intelligent equipment every semester, thereby reducing the curriculum-post matching lag. Second, to deepen industry-education integration, the college can sign multi-year strategic cooperation agreements with automobile enterprises, set special subsidy policies for enterprise part-time instructors, and construct two-way teacher-technician exchange channels to support sustainable joint curriculum development. Third, regarding the improvement of the teacher training system, all professional teachers are required to complete 1 to 2 months of on-site enterprise practice per academic year. Teachers' enterprise practice performance will be incorporated into the assessment standards for dual-qualified teachers, and major-specific integrated teaching competitions will be regularly held each semester to promote continuous improvement of teachers' comprehensive teaching capabilities. Fourth, in terms of training resource upgrading, the college can apply for special vocational education funds to replace outdated training equipment in batches, build a unified digital training management platform, and arrange full-time administrative staff to conduct daily inspection and maintenance of training facilities to ensure the stable operation of practical teaching resources.

6.4 Research Limitations & Future Research Directions

6.4.1 Limitations

This study only collects cross-sectional questionnaire data from full-time teachers, without students and enterprise frontline technicians as research objects; no long-term longitudinal tracking is carried out to test the long-term effect of the proposed guidelines.

6.4.2 Future Research

This study puts forward several feasible directions for future relevant research. First, subsequent research can expand the research samples by incorporating student groups and enterprise technical staff, so as to realize a comprehensive multi-stakeholder evaluation of the practical effect of the Work-Based Learning Model. Second, comparative research can be carried out among technician colleges with different industrial positioning to summarize differentiated reform paths suitable for various school-running characteristics. Third, future studies can conduct longitudinal tracking research lasting two to three academic years to further verify the practical implementation effect and sustainability of the optimization guidelines proposed in this paper. Fourth, the four major evaluation dimensions can be further subdivided into refined secondary measurable indicators, so as to quantitatively analyze the internal correlation between sub-dimensions and the overall teaching quality of the Work-Based Learning model.

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