

Research on Practical Paths for Vocational Teaching Staff Construction from the Perspective of Tree-shaped Ecological Model

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Abstract: Vocational education serves as the main platform for cultivating skilled talents, and the quality of teaching staff directly determines school-running standards and education efficiency. The tree-shaped ecological model follows the logic of “root foundation building, trunk core strengthening, luxuriant branches and leaves, soil empowerment”, which matches the construction requirements of dual-qualified teachers in higher vocational colleges. At present, higher vocational teaching staff are confronted with dilemmas including weak ecological foundations, insufficient core competencies, unbalanced staff structure and restricted development environment. Based on this model, this paper explores high-quality ecological development paths for teaching staff from four dimensions: consolidating the root system of teacher recruitment and training, forging the trunk of dual-competency teachers, constructing multi-collaborative branches and leaves, and optimizing the soil of institutional guarantee.

Keywords: Tree-shaped ecological model; Vocational education; Construction of teaching staff; Dual-qualified teachers

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1. Introduction

Vocational education is an important component of China’s modern education system and a key carrier for cultivating high-skilled talents ^[1]. Multiple national policies have clearly put forward requirements to strengthen the construction of dual-qualified teaching staff and improve teachers’ practical teaching ability and professional literacy ^[2]. As the core subject of vocational education, higher vocational colleges rely on the structure, ability and literacy of their teaching staff to determine the quality of skilled talent cultivation, which acts as a core guarantee to serve the real economy and support the construction of a manufacturing powerhouse.

Current construction of teaching staff in higher vocational colleges is plagued by problems such as disconnection between practical capabilities and industries, low proportion of dual-qualified teachers, rigid recruitment and training mechanisms, homogenized assessment and evaluation, and insufficient school-enterprise collaboration ^[3]. The tree-shaped ecological model regards teaching staff as an organic ecosystem

and draws on the symbiotic logic of tree roots, trunks, branches and leaves, emphasizing element coordination, dynamic balance and continuous evolution, which provides a new perspective and practical framework to resolve existing dilemmas. Combined with the school-running characteristics of higher vocational colleges, this paper analyzes ecological predicaments and explores systematic construction paths to offer references for high-quality development of vocational teaching staff.

2. Core connotation of tree-shaped ecological model and its compatibility with vocational teaching staff construction

2.1. Core connotation of tree-shaped ecological model

Integrating ecological systematic view, balance view, coordination view and tree growth laws, the tree-shaped ecological model forms a four-in-one analytical framework.

- (1) Root foundation building corresponds to teacher recruitment and basic literacy, determining nutrient absorption and risk resistance capacity.
- (2) Trunk core strengthening corresponds to teachers' core competencies and professional literacy, serving as the core support for career development.
- (3) Luxuriant branches and leaves correspond to teaching staff structure and diversified capabilities, deciding functional efficiency and industry adaptability.
- (4) Soil empowerment corresponds to institutional guarantees and development ecology, determining teachers' growth speed and potential.

2.2. Compatibility between tree-shaped ecological model and higher vocational teaching staff construction

- (1) Compatibility between root foundation building and teacher recruitment & training

Recruitment and training in higher vocational colleges need to balance theoretical literacy and practical capabilities, just as tree roots must extend deep and wide. Colleges should introduce highly educated and high-ranking professional talents as well as technical backbones from enterprises to consolidate the ecological foundation of teaching staff^[4].

- (2) Compatibility between trunk core strengthening and dual-qualified competencies

The core competency of dual-qualified teachers lies in integrating theoretical and practical teaching abilities. Similar to a tree trunk, it forms the core support of teachers' career development and decides whether they can meet teaching requirements and cultivate industry-oriented skilled talents^[5].

- (3) Compatibility between luxuriant branches and leaves and teaching staff structure

Majors in higher vocational colleges are closely connected with industrial demands, which requires a diversified and collaborative teaching staff structure covering age, professional title, academic background, discipline and practical experience. Just as tree branches and leaves should be complete and well-distributed, colleges need to realize ecological balance of teaching team structure^[6].

- (4) Compatibility between soil empowerment and development environment

The growth of higher vocational teachers relies on external environments including sound institutional guarantees, sound school-enterprise collaboration mechanisms and scientific assessment systems, just as trees need fertile soil, sufficient water and sunlight to achieve ecological development of teaching staff with sustained empowerment^[7].

3. Ecological dilemmas of higher vocational teaching staff construction from the perspective of tree-shaped ecological model

3.1. Weak root foundation: Rigid teacher recruitment & training mechanism, disconnection between basic literacy and industrial demands

Standards for talent introduction are highly homogenized with overemphasis on academic degrees and professional titles. Most newly recruited teachers are fresh graduates lacking corporate work experience and practical teaching capabilities^[8]. Teacher training leans toward theoretical content, with in-depth school-enterprise cooperation absent, making it difficult for teachers to access cutting-edge industrial technologies and production procedures, thus separating professional literacy from industrial needs. Meanwhile, insufficient attention is paid to part-time teachers, who cannot be effectively integrated into teaching systems, leading to poor coordination between full-time and part-time teachers.

3.2. Insufficient trunk core strength: Lack of core competencies among dual-qualified teachers, inadequate professional development motivation

The certification standards for dual-qualified teachers are ambiguous, neglecting practical teaching and industrial service capabilities and rendering the certification process formalistic. Corporate practice mechanisms are missing, resulting in teachers' weak practical capabilities and disconnection between teaching content and industrial frontiers^[9]. Professional title evaluation and assessment overly prioritize academic papers while ignoring practical teaching and industrial service contributions.

3.3. Unbalanced luxuriant branches and leaves: Irrational teaching staff structure, deficient diversified collaborative capabilities

The age structure features an inverted pyramid with an overhigh proportion of young teachers and insufficient middle-aged backbones and academic leaders, lacking a mentorship echelon. The professional title structure is low-level, with most teachers holding junior and intermediate titles, while senior teachers with practical experience are scarce. Disciplinary structures fail to match college layout and industrial demands; the proportion of teachers with corporate experience is low, and collaborative mechanisms between theoretical and practical teachers remain imperfect.

3.4. Restricted soil empowerment: Imperfect institutional guarantee system, unformed school-enterprise collaborative ecology

Personnel administration is constrained by staffing quotas, making it difficult to introduce corporate technical backbones. Remuneration and career development channels for part-time teachers lack guarantees, hindering two-way talent mobility between schools and enterprises^[10]. Assessment mechanisms copy those of general universities without vocational education characteristics. School-enterprise cooperation stays superficial without in-depth co-construction mechanisms, and insufficient investment results in outdated practical training facilities.

4. Practical paths for higher vocational teaching staff construction from the perspective of tree-shaped ecological model

4.1. Consolidate root foundation: Innovate teacher recruitment & training mechanisms to consolidate the ecological foundation of teaching staff

As the foundation of teaching staff construction, teacher recruitment and training should follow the principles

of diversification, practicality and collaboration to innovate relevant mechanisms and strengthen the nutrient absorption capacity of the teaching root system ^[11].

(1) Optimize talent introduction standards to realize diversified recruitment

Break the degree-and-title-only recruitment model and establish diversified standards integrating academic background, professional competence and practical experience. Industrial practical experience and technical proficiency shall be taken as core assessment indicators. When recruiting highly educated and senior professionals, priority shall be given to candidates with corporate working experience; meanwhile, academic and title restrictions shall be relaxed for enterprise technical backbones.

(2) Improve teacher training system to strengthen practical training

Build a three-in-one training system consisting of in-school training, corporate practice and off-campus advanced studies to focus on improving teachers' practical capabilities. In-school training focuses on practical teaching methodologies and curriculum design with lectures delivered by enterprise experts and outstanding practical teachers. Regular corporate practice shall be mandated, requiring teachers to work in production frontlines for at least 1 to 2 months every year to master cutting-edge industrial technologies and convert them into teaching cases. Off-campus advanced studies target emerging technologies and professional development, with teachers sent to national and provincial training programs, high-quality universities and enterprises at home and abroad.

(3) Strengthen part-time teacher team construction to promote collaborative recruitment and training

Integrate part-time teacher development into the overall school talent plan and improve full-cycle management systems covering recruitment, training, assessment and incentives ^[12]. Provide systematic teaching capacity training for corporate part-time teachers to improve their lecturing, curriculum design and student management skills. Establish a mentorship mechanism pairing full-time teachers with part-time teachers to realize deep integration of theoretical and practical teaching.

4.2. Forge strong trunks: Strengthen core competencies of dual-qualified teachers to consolidate professional support for teaching staff

The core competency of dual-qualified teachers constitutes the core of teaching staff construction. Colleges shall follow the principles of practicality, integration and specialization to cultivate core competencies and forge professional trunks that strengthen the overall support capacity of teaching teams.

(1) Clarify dual-qualified teacher certification standards to standardize competency assessment

Break the superficial certification model of holding both teaching and vocational certificates, and establish dual-qualified teacher certification standards centered on theoretical teaching capacity, practical teaching capacity and industrial service capacity ^[13]. Include indicators such as practical teaching effects, student skill competition guidance achievements, corporate technical service projects and school-enterprise curriculum development results into certification assessment. Special allowances and priority in professional title evaluation shall be offered to certified dual-qualified teachers as incentives.

(2) Boost practical teaching capacity to realize practice-oriented teaching

Promote the transformation of classroom teaching from a theoretical lecture-dominated mode to an integrated theory and practice mode, and popularize project-based, case-based, situational and work-process-oriented teaching methodologies. Establish a practical teaching quality evaluation system taking students' skill mastery and post adaptability as core indicators to assess teachers' practical teaching outcomes.

(3) Build professional development platforms to support specialized growth

Construct in-school training bases and school-enterprise R&D centers as carriers for teachers' practical teaching and technological R&D. Encourage teachers to participate in corporate technological R&D and transformation projects to upgrade industrial service capacity. Support teachers in formulating vocational curriculum standards, compiling textbooks and developing teaching resources to enhance professional research capabilities.

4.3. Grow luxuriant branches and leaves: Optimize teaching staff structure to improve diversified collaborative capabilities

Teaching staff structure serves as the functional extension of team construction. Colleges shall follow the principles of rationalization, echelon development and coordination to optimize structural systems, enrich ecological branches and leaves, and boost the ecological adaptability and collaborative capacity of teaching teams^[14].

(1) Optimize age and title structures to build echeloned teaching teams

Strengthen recruitment and training of middle-aged academic backbones and discipline leaders to implement mentorship mechanisms. Improve training systems for young teachers via tutor guidance, teaching observation and corporate advanced studies to upgrade their practical teaching abilities. Reform professional title evaluation to lower research thresholds for practical teachers and take practical teaching and industrial service contributions as core evaluation indicators, expanding promotion channels for practice-oriented teachers.

(2) Optimize disciplinary structures to match industrial development demands

Increase recruitment and training of teachers majoring in emerging and strategic industries. Establish dynamic adjustment mechanisms for teachers' professional development and encourage interdisciplinary learning to improve cross-disciplinary teaching capacities.

(3) Optimize practical experience structure to advance school-enterprise teacher collaboration

Organize full-time and part-time teachers to jointly formulate teaching plans, design courses, deliver classes and guide student practice to realize deep integration of theoretical and practical teaching. Build a two-way exchange mechanism between school and enterprise teachers to achieve two-way talent mobility and resource sharing.

4.4. Fertilize nutritious soil: Improve institutional guarantee system to build a school-enterprise collaborative development ecology

Institutional guarantees and development environments act as external support for teaching staff construction. Colleges shall follow systematic, scientific and collaborative principles to perfect guarantee systems, enrich the ecological soil and provide sustained empowerment for ecological development of teaching teams.

(1) Deepen personnel management reform to invigorate teaching staff

Break the restrictions of staffing quotas and adopt flexible employment systems such as the post quota system and contract employment to lower recruitment thresholds for enterprise technical backbones^[15]. Perfect rights and interests guarantees for part-time teachers, with remuneration and career development incorporated into unified management. Establish performance incentive mechanisms linking practical teaching outcomes, student skill cultivation and industrial service contributions directly to salary and title evaluation.

(2) Construct scientific assessment systems reflecting vocational education characteristics

Centering on teaching with practice and industrial service as orientation, reduce the weight of academic

papers and research projects while raising the proportion of indicators covering practical teaching, corporate technical services and school-enterprise curriculum development. Introduce multi-dimensional evaluators including students, peer teachers, enterprises and school administrators to improve comprehensiveness and objectivity of assessment.

(3) Perfect school-enterprise-government collaborative education mechanisms to build a multi-party collaborative ecology

Deepen school-enterprise-government cooperation and establish joint councils to coordinate curriculum co-development, co-construction of training bases and technological R&D. Motivate enterprises to participate in teaching staff construction through financial subsidies and tax incentives to form a collaborative education ecosystem.

5. Conclusion

The construction of vocational teaching staff constitutes a systematic, long-term ecological project. The tree-shaped ecological model offers a brand-new theoretical perspective and practical framework. Only by consolidating the recruitment and training root system, forging dual-competency professional trunks, optimizing diversified collaborative staff structures and enriching institutional guarantee soil, and promoting coordination, dynamic balance and sustainable evolution of all elements, can colleges resolve existing construction dilemmas and build a team of dual-qualified teachers with noble ethics, proficient expertise, rational structure and vitality, thus supporting high-quality development of vocational education and cultivating more high-quality skilled talents for economic and social development.

Disclosure statement

The authors declare no conflict of interest.

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