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Reconstruction and Practice of Talent Training Model for Computer Majors in Higher Vocational Education Based on Industry-Education Integration

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Abstract: With the rapid development of the digital economy, talent training in computer majors at higher vocational colleges faces prominent problems such as disconnection from industrial demands, outdated curricula, and obsolete teaching methods. Based on the concept of industry-education integration, this study reconstructs competence-oriented training objectives and curriculum systems, innovates contextualized teaching methods, and builds diversified and comprehensive evaluation mechanisms. It systematically advances school-enterprise collaborative education mechanisms, the construction of "dual-qualified" teaching teams, and dynamic quality assurance systems, thereby providing crucial support for deepening reforms in higher vocational computer education and promoting the development of the digital economy.

Keywords: Industry-Education Integration; Higher Vocational Computer Education; Reconstruction of Talent Training Model

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Introduction

With the rapid development of information technology, the computer industry has become a vital force driving social progress and industrial upgrading. In the face of rapidly changing technologies and shifting market demands, cultivating high-level computer professionals with innovative spirit and practical ability has become an important mission of higher vocational education [1]. However, numerous problems exist in current talent training for computer majors: unreasonable training objectives, slow updates of course content, and teaching materials that lag behind industry development [2]. These issues have created a gap between graduates' competencies and job requirements.

To address these challenges, higher vocational education urgently needs to explore new approaches and promote deeper integration of education with industry. In this context, industry-education integration has become a key reform direction. It is a collaborative model in which the education system and industry jointly cultivate talent.

Education and industry are two core systems supporting social development, closely interconnected: education provides talent, while industry offers practical environments. In the fast-evolving computer field, with short knowledge cycles, interaction between education and industry is particularly vital. Industry-education integration, through multi-level collaboration mechanisms, enables the education system to flexibly respond to industrial changes, ensuring effective alignment between talent cultivation and job requirements.

Higher vocational education aims to cultivate high-quality technical professionals with practical competence and innovative literacy. This requires going beyond knowledge transmission, focusing instead on capacity building and holistic development. Competency-based theory emphasizes that students improve comprehensive abilities by completing tasks in real contexts. Constructivist learning theory posits that learning is a process of actively constructing meaning through problem-solving and collaboration. Both perspectives underscore the necessity of industry-education integration to create practice-oriented, contextualized learning environments that truly enhance training quality.

Computer majors are highly technical and cross-disciplinary, with fast knowledge renewal, broad applications, and uncertain technological pathways. Training must therefore be flexible and open. Only through industry-education integration, aligned with industry frontiers, can vocational education keep pace with the times. Integration also enhances students' skills, shapes professional values, instills dedication, and fosters social responsibility. Immersed in authentic industrial contexts, students learn the societal value and ethical boundaries of technology early on, forming well-rounded professional identities. This benefits personal development and strengthens vocational education's ability to serve society.

1.Necessity of Reconstructing the Talent Training Model

1.1 External Drivers: Industrial Demand Pushing Model Reform

The digital economy has brought profound, comprehensive changes to society, inevitably reshaping industries. Future professionals must not only master solid foundational knowledge and skills but also possess innovation, communication, and teamwork abilities. At present, vocational colleges mainly cultivate foundational talent, emphasizing subject-specific knowledge and lab training. However, insufficient cross-disciplinary learning limits graduates' ability to apply knowledge flexibly in complex real-world scenarios.

Moreover, enterprises increasingly value students' competencies over knowledge accumulation. Current vocational teaching models cannot meet these expectations, necessitating reform to raise educational quality and better serve societal development. In this sense, external forces create urgency, while internal factors remain the root drivers of transformation.

1.2 Internal Constraints: Professional Development Urgently Needs Optimization

Many computer-related majors in higher vocational colleges face issues such as outdated teaching plans, slow application of new technologies, and curricula misaligned with industry needs. Traditional "instilling" teaching methods dominate, with teachers lecturing and students listening, lacking interactive, research-oriented learning. No distinctive interactive practice-based curriculum has been established, let alone one that fosters innovation or problem-solving capabilities.

Examinations remain overly focused on knowledge memorization and final results, failing to reflect students' actual operational skills or comprehensive qualities. This mismatch restricts professional development and weakens alignment with industry.

1.3 Weak Industry-Education Linkage: Lack of Deep Collaboration

Although cooperation between vocational colleges and enterprises is increasing, it often remains superficial, limited to internships or guest lectures. Few partnerships extend to jointly designing training programs, co-developing curricula, or sharing teaching resources. Many collaborations are project-based, short-term, and vulnerable to market changes, lacking institutionalization or stability.

As a result, education is still mainly unilateral, with enterprises passively accepting students. Without a genuine community of interest, sustainable collaboration is hard to achieve, hindering computer majors' educational progress. Thus, a comprehensive reconstruction of the current system is urgently required.

2.Basic Approaches to Model Reconstruction

2.1 Competence-Oriented Integration of Objectives and Curriculum

Talent cultivation should transcend single-skill instruction, focusing instead on holistic competency. Alongside foundational knowledge and skills, emphasis must be placed on innovation, ethics, and social responsibility. Training objectives should dynamically adjust to evolving industrial needs and social trends[3].

Curriculum structures should break disciplinary boundaries, integrating computer fundamentals, professional skills, general

education, cross-disciplinary learning, and practice. Modular and flexible course design should empower students to customize learning paths aligned with career goals, resolving gaps between theory and practice.

2.2 Student-Centered Contextualized Teaching

Teaching must shift from teacher-centered knowledge transmission to student-centered competence building. Project-based, task-driven, and scenario-simulated methods should immerse students in real or simulated environments, fostering active inquiry, collaboration, and flexible application of knowledge.

Digital tools should be fully utilized to implement blended learning, increasing interactivity and autonomy. Such contextualized teaching strengthens students' problem-solving skills, adaptability, and teamwork, laying solid foundations for their future careers.

2.3 Diversified Comprehensive Evaluation Mechanisms

Evaluation must move beyond memory-based tests toward a multidimensional system combining formative and summative assessments. Criteria should include project implementation, teamwork, and innovation, recording students' progress and capabilities dynamically.

Third-party evaluations involving governments, industries, schools, and enterprises should be introduced, ensuring feedback-driven continuous improvement and close alignment between training and industrial demand [4].

3.Systematic Construction of Practice Pathways

3.1 Deep Industry-Education Integration in Mechanisms, Curriculum, and Practice

Stable, institutionalized collaboration is key. Vocational colleges and enterprises should form strategic partnerships via joint committees and long-term agreements, ensuring coordination in goal-setting[5], curriculum design, and practice platforms.

Courses should dynamically incorporate cutting-edge technologies and real projects, regularly updated to maintain relevance. Practice should extend beyond campus into authentic enterprise environments, with progressive training systems guiding students from basic skills to complex applications. Immersive learning in real workplaces enhances operational, problem-solving, and professional competencies.

3.2 Building "Dual-Qualified" Faculty Teams

Teachers must combine theoretical expertise with industry experience. Mechanisms such as enterprise training and school-industry exchanges should strengthen teachers' ability to integrate theory with practice. Certification systems should formally recognize practical industry experience, fostering deeper teaching-practice integration.

3.3 Dynamic Quality Assurance System

Continuous improvement should guide quality assurance, with real-time monitoring, staged evaluations, and multi-party feedback. Multiple stakeholders—schools, enterprises, students, and experts—should participate in quality assessment, forming a "evaluation–feedback–improvement" loop that evolves with industrial needs.

4.Challenges and Countermeasures

4.1 Institutional Deficiencies: Strengthening Policy and Top-Level Design

Current industry-education integration lacks strong legal and policy frameworks, leading to superficial cooperation. To address this, governments must implement targeted laws and policies, institutionalizing integration and providing sustained support to ensure genuine collaboration.

4.2 Faculty and Curriculum Mismatch: Enhancing Capabilities and Updating Content

Challenges include mismatches between teachers' theoretical focus and practical demands, and curriculum lagging behind fast-changing technologies. Solutions include systematic training and enterprise practice for teachers, alongside agile mechanisms to update curricula in sync with industry developments [6].

4.3 Insufficient Student Initiative: Innovating Teaching and Support

Some students lack intrinsic motivation and autonomy. Interactive methods like project- and problem-based learning should enhance engagement, while learning support platforms and personalized guidance should build independent learning habits, ensuring lifelong learning capacity.

Conclusion

Reconstructing talent training models for computer majors around industry-education integration is a strategic pathway to align with the times, meet industrial needs, and transform education. By optimizing objectives, curricula, teaching, and evaluation while strengthening school-industry collaboration, updating content, expanding practice platforms, and enhancing faculty capabilities, vocational education can cultivate more adaptable and sustainable talent.

Future development will trend in four directions: (1) deeper integration, with multi-dimensional ecosystems moving from phased cooperation to full-process collaboration; (2) accelerated digitalization, embedding intelligent technologies into personalized teaching; (3) cross-disciplinary fusion, breaking subject barriers to nurture integrative talent; and (4) lifelong learning, extending education beyond fixed programs into dynamic systems spanning whole careers.

Despite ongoing challenges in policy, faculty, curricula, and student motivation, continuous innovation and optimization will drive vocational education's growth, supplying high-quality talent to the digital economy and broader society.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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