

Research on the Teaching Reform Path of "Posts, Courses, Competitions, Certificates, and Innovation" in the New Energy Vehicle Technology Major Empowered by New Quality Productive Forces

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Abstract: Based on the integrated education concept of "Posts, Courses, Competitions, Certificates, and Innovation" as a five-in-one system, this paper systematically analyzes the new requirements imposed by new quality productive forces on the cultivation of talents in the new energy vehicle technology major, including the demands for compound knowledge, digital skills, and innovative capabilities. It identifies current practical challenges such as outdated course content, disconnected practical training conditions, misaligned faculty structure, and imperfect integration mechanisms. The paper proposes reform strategies including constructing a modular curriculum system, innovating project-based teaching models, improving diversified evaluation mechanisms, and exploring innovative talent cultivation paths. These strategies aim to provide theoretical references and practical guidance for improving the quality of professional talent cultivation and supporting the high-quality development of the regional new energy vehicle industry.

Keywords: new quality productive forces; new energy vehicle technology major; posts, courses, competitions, certificates, and innovation; teaching reform

1. INTRODUCTION

New quality productive forces, driven by technological innovation as the core engine, are accelerating the deep transformation of the new energy vehicle industry towards electrification, intelligence, and connectivity. The accelerating pace of industrial technology iteration and the dynamic upgrading of job competency standards place entirely new demands on the knowledge structure, skill competencies, and innovative capabilities of technical and skilled talents. However, current higher vocational new energy vehicle technology programs generally face issues such as course content lagging behind industry frontiers, practical training conditions not aligning with actual enterprise applications, and insufficient depth in industry-education integration. These issues make it difficult to meet the demand for innovative and compound high-skilled talents required by the development of new quality productive forces. This paper explores the teaching reform path integrating "Posts, Courses, Competitions, Certificates, and Innovation," aiming to solve the problem of mismatch between talent cultivation and industrial needs, and to provide an actionable plan for cultivating high-quality technical and skilled talents adapted to the development of new quality productive forces.

2. NEW REQUIREMENTS FOR TALENT CULTIVATION IN NEW ENERGY VEHICLE TECHNOLOGY MAJORS FROM NEW QUALITY PRODUCTIVE FORCES

New quality productive forces represent an advanced state of productivity where innovation plays a leading role. In the new energy vehicle industry, new quality productive forces are specifically manifested in breakthroughs in battery technology (such as solid-state batteries), the integration of intelligent connected and autonomous driving technologies, the popularization of digital production and intelligent manufacturing models, and the new industrial ecosystem

integrating vehicles, energy, roads, and cloud. These transformations impose multi-dimensional new requirements on the cultivation of talents in the new energy vehicle technology major.

2.1 Compound Knowledge Structure

New quality productive forces break down the technical barriers of traditional industries. New energy vehicles have become complex systems integrating multi-disciplinary knowledge including mechanics, electronics, electrical engineering, materials, information technology, communications, and artificial intelligence. Therefore, the talents cultivated must no longer only master traditional automobile structure and maintenance knowledge, but also need to possess an interdisciplinary knowledge system.

2.2 Digital and Intelligent Skill Competencies

New quality productive forces are characterized by digitalization and intelligence. Advanced technologies such as artificial intelligence algorithms are being widely applied in various aspects of new energy vehicle production, testing, and operation & maintenance. Therefore, professional talents must possess digital skills; traditional "blue-collar" workers who only master manual disassembly and assembly skills are no longer adequate.

2.3 Innovative and Cross-boundary Capability Traits

The core driving force of new quality productive forces is innovation. Against the backdrop of accelerating technological iteration, job competency standards are also dynamically changing. This requires that the talents cultivated not only possess the ability to solve practical problems on the production front line but also have the capacity for continuous learning and innovative thinking, enabling them to proactively adapt to and participate in technological advancements.

3. PRACTICAL CHALLENGES FACING CURRENT TEACHING REFORM IN NEW ENERGY VEHICLE TECHNOLOGY MAJORS

Although vocational colleges have made some progress in developing the new energy vehicle technology major, when measured against the new requirements of new quality productive forces, current teaching reform still faces a series of deep-seated challenges.

3.1 Course Content Updates Lag Behind Technological Iteration Speed

The course content in many vocational colleges still remains focused on relatively mature traditional electric drive technologies and basic battery management knowledge, resulting in a significant "time lag" between what students learn and the industry frontier [4]. This lag directly weakens graduates' adaptability to new technologies and new job positions, making it difficult to meet enterprise demands for talents mastering the latest technologies.

3.2 Practical Teaching Conditions Disconnect from Actual Enterprise Applications

Practical teaching is a critical link in cultivating high-skilled talents. However, some institutions face the problem of having training equipment that is either "available but unused" or "used but outdated." On one hand, due to funding constraints, training equipment is insufficient in quantity and outdated in model, failing to reflect the advanced equipment actually used by enterprises. On the other hand, the design of training projects often remains at the level of basic operations like disassembly, assembly, and measurement, lacking simulation of real enterprise work scenarios, resulting in a significant gap between students' practical abilities and enterprise job requirements.

3.3 Misalignment Between Faculty Knowledge Structure and New Quality Productive Forces Demands

The faculty is the core force in teaching reform. The knowledge structure of teachers in the new energy vehicle technology major often has inherent "path dependency," with generally insufficient knowledge reserves and a lack of systematic interdisciplinary knowledge. Moreover, most teachers lack frontline experience in enterprises, their understanding of industry development trends and technology application scenarios is not deep enough, making it difficult to effectively integrate real enterprise cases and cutting-edge technologies into teaching, leading to a disconnect between teaching content and actual production.

3.4 Imperfect Integration Mechanism of "Posts, Courses, Competitions, and Certificates," with the "Innovation" Element Missing

In the current practice of integrating "Posts, Courses, Competitions, and Certificates," the common problem is "integration without real connection." For example, the curriculum system fails to undergo systematic reconstruction based on dynamic changes in job positions; evaluation standards between skill competitions and vocational certificates are inconsistent; school-enterprise collaboration is insufficient. More importantly, the key element of "innovation" is often neglected or marginalized, failing to be systematically integrated into the entire talent cultivation process, resulting in insufficient cultivation of students' innovative thinking and entrepreneurial abilities, which does not meet the requirements of the innovation-oriented nation building for new quality talents.

4. TEACHING REFORM PATH INTEGRATING "POSTS, COURSES, COMPETITIONS, CERTIFICATES, AND INNOVATION" EMPOWERED BY NEW QUALITY PRODUCTIVE FORCES

To address the above challenges and cultivate high-quality compound technical and skilled talents adapted to the development of new quality productive forces, the new energy vehicle technology major must deepen teaching reform and construct a five-in-one integrated education model of "Posts, Courses, Competitions, Certificates, and Innovation."

4.1 Construct a Modular Curriculum System Integrating "Posts and Courses" to Align with Industry Frontiers

Taking job demands under the context of new quality productive forces as the logical starting point, transform the job competency map into course content. First, establish a dynamic course update mechanism. Regularly investigate industrial technology development trends and job competency standards, promptly delete outdated content, and transform cutting-edge technologies such as solid-state battery technology, intelligent cockpit systems, and Internet of Vehicles security into teaching modules. Second, reconstruct the modular curriculum system. Break the traditional disciplinary logic and construct a curriculum system consisting of "platform basic courses + core professional courses + directional module expansion courses."

4.2 Innovate a Project-based Teaching Model Integrating "Competitions and Courses" to Enhance Comprehensive Abilities

Fully integrate the standards and content of skill competitions into daily teaching to achieve promoting teaching and learning through competitions. First, transform competition content into projects. Deeply analyze the regulations and scoring standards of competitions such as "New Energy Vehicle Technology and Services" and "Intelligent Connected Vehicle Technology," decompose competition tasks into several teaching projects, and integrate them into core courses. Second, implement practical teaching methods. Promote project-based, case-based, and inquiry-based teaching. Using real enterprise projects as carriers, guide students to form teams and complete the entire process from plan formulation, implementation, and operation to report writing, cultivating their ability to solve complex problems, teamwork spirit, and innovative thinking.

4.3 Improve the Diversified Evaluation Mechanism Integrating "Certificates and Courses" to Strengthen Professional Competence

Deeply integrate the assessment standards of vocational skill level certificates (such as "1+X" certificates) with course teaching and evaluation. First, align course content with certificate standards. Deconstruct the requirements of certificates like "Intelligent New Energy Vehicle Vocational Skill Level Certificate" into teaching knowledge points and skill points, ensuring that students can smoothly connect with certificate assessments after completing course learning. Second, diversify evaluation methods. Establish an evaluation system combining process assessment with final assessment, and school evaluation with enterprise evaluation. Simultaneously, incorporate professional competencies (such as safety production awareness, craftsmanship spirit, professional ethics) into evaluation indicators, guiding students to cultivate both technical skills and moral integrity.

4.4 Explore an Innovative Talent Cultivation Path Guided by "Innovation" to Stimulate Innovative Potential

Incorporate innovation education throughout the entire talent cultivation process to cultivate students' innovative thinking and entrepreneurial abilities. First, build a practice platform integrating "training and innovation." Relying on on-campus and off-campus training bases, establish "New Energy Vehicle Technology Innovation Workshops" or "Maker Spaces," equipped with necessary software and hardware development tools to support students' innovative practice. Encourage students to participate in teachers' horizontal research projects and enterprise technology breakthroughs. Second, actively organize

students to participate in regular innovation competitions. For example, the industry and schools regularly hold new energy vehicle innovation design competitions, energy-saving technology challenges, etc., establishing innovation credits and reward mechanisms to stimulate students' innovative enthusiasm. Third, strengthen research feedback to teaching. Encourage teachers to transform research results and technical patents into teaching cases and experimental projects, allowing students to understand and master cutting-edge technologies from a higher starting point, cultivating their ability to transform from "technology applicators" to "technology improvers" and even "technology creators."

5. CONCLUSION

The development of new quality productive forces poses unprecedented challenges to the cultivation of talents in the new energy vehicle technology major, while also providing historic opportunities for the reform and innovation of vocational education. Faced with the new situation of accelerating industrial technology iteration and restructuring talent demands, traditional teaching models are no longer sustainable. By constructing the five-in-one integrated education model of "Posts, Courses, Competitions, Certificates, and Innovation," with "Posts" as the logical starting point, "Courses" as the implementation carrier, "Competitions" as the driving engine, "Certificates" as the quality benchmark, and "Innovation" as the value guide, the practical challenges in current teaching reform can be effectively addressed.

In the future, higher vocational colleges should actively embrace the changes brought by new quality productive forces, continuously deepen industry-education integration, dynamically adjust professional layouts, strengthen the cultivation of digital, intelligent, and green skills, and continuously optimize the integration mechanism of "Posts, Courses, Competitions, Certificates, and Innovation." They should strive to cultivate more innovative and compound technical and skilled talents who can adapt to and lead industrial development, thereby providing solid talent support for the high-quality development of China's new energy vehicle industry and the accelerated formation of new quality productive forces.

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