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Research on Innovation Paths of Talent Training in Universities under Industry-Education Integration Transformation: Practical Exploration Based on Triple Identities

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Abstract: Against the strategic background of universities transforming into industry-education integration-oriented institutions, business management is shifting from a control-oriented model to an empowerment-oriented model [1]. At the time, the core contradiction of talent training has shifted from "scale supply" to "quality adaptation." Based on the triple identities of university counselor, industrial college teaching secretary, and administrative staff, this paper analyzes five key problems in traditional industry-education integration: outdated teaching materials, superficial practical teaching, insufficient teacher collaboration, supply-demand mismatch, and students' cognitive biases. Corresponding innovation paths are proposed from five dimensions: content renovation, practical reconstruction, teaching optimization, docking upgrading, and literacy cultivation. A closed-loop "student-teaching-administration" system is built by leveraging the triple identities' collaborative advantages, providing practical references for effective talent training.

Keywords: Integration of industry and education; Talent training innovation; Triple identities; Collaborative education

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1. Introduction

With the implementation of the Healthy China 2030 Initiative and the rapid development of the biomedical engineering industry, society has an increasingly urgent demand for compound talents who are proficient in electronic science and technology and familiar with clinical medical needs.

As a core approach to breaking down barriers between education and industry, Industry-Education Integration has given birth to the industry college as a new type of educational entity [2]. Against this background, the major of Electronic Science and Technology (Medical Electronic Engineering) in the Medical-Engineering Industry College of the School of Health Management undertakes the mission of cultivating talents for the future R&D,

maintenance, and innovation of medical electronic equipment.

To better promote school reform, this paper focuses on the pivotal "three-in-one" role: counselor (responsible for students' ideological and political education and development), teaching secretary (in charge of teaching operation and management), and administrator (responsible for college operation and support). This role spans the four-dimensional interface of "students–faculty–university–industry." It not only directly addresses students' growth puzzles and delves into the details of teaching links, but also participates in the design and implementation of the college's top-level systems, thus better understanding and serving the industry. This unique positioning enables a systematic, in-depth, and practical understanding of the ideal and actual states of talent cultivation, and provides a unique practical field for promoting innovation in talent cultivation models and content.

2. Reality review: Challenges of the traditional talent cultivation model

From the daily work perspective of the "three-in-one" role, prominent problems exist when the traditional talent cultivation model integrates the concept of industry-education integration:

2.1. Misalignment between training objectives and industrial demands

As an administrator, frequent communication with enterprises reveals criticisms that graduates are "proficient in electronics but lack medical knowledge" and "insufficient in innovative thinking." These problems are not only present among our students; the teachers at the school also lack innovative thinking [3]. As a teaching secretary, course scheduling shows that the curriculum system still focuses on traditional electronic science, while medical courses are mostly introductory, lacking in-depth interdisciplinary integration. High-quality applied engineering talents have become an urgent need [4].

2.2. Rigid curriculum system and difficult cross-border integration

In teaching management, institutional obstacles often arise in course attribution, credit recognition, and faculty assessment. Genuine medical-engineering interdisciplinary courses face severe difficulties in faculty allocation, textbook compilation, and laboratory construction, as they involve two highly distinct disciplinary systems: medicine and electronic science.

2.3. Disconnection in practical teaching and superficial industry-education integration

As a counselor, organizing student internships and practical activities reveals that some practice bases are formalistic, reducing students to "onlookers" who cannot truly participate in enterprise R&D projects. Cutting-edge industrial technologies and real clinical problems have not been effectively transformed into teaching resources.

2.4. Insufficient coordination in management mechanisms and a lack of synergistic educational force

This is particularly evident in the triple role. Ideological and political work is often disconnected from professional teaching and industrial practice, and administrative services are not fully student- and faculty-centered. Student management, teaching operation, and industrial liaison belong to separate lines with high information barriers, making it difficult to form the synergistic educational ecology required for cultivating compound talents.

2.5. Students' cognitive biases

Some students have unrealistic employment expectations, rejecting positions in small and medium-sized enterprises and grass-roots roles. This is caused by disconnected career planning education, limited career experience channels, and one-sided social perceptions of "high-quality employment."

3. Practical paths for talent training innovation

3.1. Content renovation

Construct an industry-oriented dynamic teaching system, including jointly developing loose-leaf textbooks with enterprises, building a shared teaching resource database, and inviting enterprise mentors to teach core practical courses.

3.2. Practical reconstruction

Create a project-based training system with real scenarios, optimize practical teaching processes, co-construct joint training bases, and assess practical performance based on real project outcomes.

3.3. Teaching optimization

Establish a two-way empowerment system for teachers, conduct special training for enterprise mentors, implement a dual-tutor system, and build a multi-dimensional teaching quality feedback mechanism.

3.4. Docking upgrading

Build a precise supply-demand matching system, establish a university-enterprise talent docking platform, introduce big data matching technology, deepen cooperation with human resource companies, and improve the graduate tracking and feedback mechanism.

3.5. Literacy cultivation

Construct a diversified career cognition guidance system, including industry lectures, courses taught by front-line engineers, optimized career planning curricula, and on-the-job experience programs.

4. Collaborative implementation strategies under the triple identities

To address the above issues, the author proposes an integrated innovative talent cultivation model of "ideological guidance–teaching collaboration–administrative support," achieving "three-dimensional empowerment" through the triple roles.

4.1. Counselors

Professionalizing ideological education: Integrate themes such as "serving the nation through medical engineering," "craftsman spirit," and "medical ethics" into thematic class meetings, group activities, and career planning. Invite industry mentors and outstanding alumni to share insights on national strategies and career prospects in the medical electronics field.

Precision academic career guidance: Leverage proximity to students to identify their interests early, guiding them to join relevant research groups or innovation projects for personalized development [5].

4.2. Teaching secretaries

Modular and project-based curriculum system: Collaborate with program leaders to design core courses such as "Human Anatomy and Physiology" and "Analog Electronic Circuits," which integrate medical and electronic science domains. Adopt a "theory + project" approach, incorporating real enterprise projects and using actual clinical problems to drive teaching.

Dynamic teaching resources: Establish an industry technology case library to promptly translate technical challenges from enterprises and clinical needs from hospitals into course cases and graduation project topics.

Standardized mentor management: Regulate the entire process of enterprise mentor management and selection, improving mechanisms for mentor recruitment, assessment, and daily management. Ensure strict selection criteria, optimize matching processes, and precisely pair students with enterprise mentors who are professionally aligned and excel in practical skills, thereby strengthening practical education.

4.3. Administrative staff

Building collaborative platforms: Promote the establishment of a "Medical Engineering School–Enterprise Interdisciplinary Center" to coordinate internal and external resources. Oversee the operation of "Industry Professor Studios" to ensure deep integration of industry elements. Facilitate connections and support for student internships in enterprises.

Optimizing management processes: Develop flexible policies for credit recognition and dual mentorship (academic + enterprise), simplify administrative procedures for interdisciplinary collaboration and project applications, and remove barriers to innovative teaching.

5. Safeguards and prospects

To ensure the effective implementation of the proposed model and content, robust safeguards are necessary.

5.1. Policy support at the school level

Grant greater autonomy to the industry school in areas such as student recruitment, faculty hiring, and fund utilization.

5.2. Development of "dual-qualified" faculty teams

Establish regular mechanisms for teachers to undertake internships in enterprises and for enterprise engineers to teach at the school.

5.3. Empowerment through digital management tools

Utilize information technology to build an integrated information platform that connects data flows in student management, teaching management, and industry resource management, thereby enhancing collaborative efficiency.

6. Conclusion

At present, the national strategy of integrating industry and education is being vigorously promoted. As educators holding triple roles, we serve as both "sentinels" and "engineers" on the front lines of this reform. We are positioned to sense the subtlest tremors and lay the foundational groundwork. Moving forward, we will continue to integrate the functions of these triple roles with a systematic mindset, striving to become a "super-interface" connecting students, the school, and the industry, and to contribute to cultivating outstanding innovative talents capable of leading the future development of the medical electronics industry.

Disclosure statement

The author declares no conflict of interest.

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