Research on Innovative Paths of Professional Course Groups in Private Application-oriented Universities Oriented to High-quality Employment — A Case Study of Harbin Institute of Information Technology

Yufeng Zhang, Lingwei Meng, Renchen Wang

Harbin Institute of Information Technology, Harbin Heilongjiang ,150010

Abstract: This paper explores how software programs in private colleges can solve the problem of mismatch between talent cultivation and industrial demand by reconstructing the curriculum system with high-quality employment as the core orientation. In response to problems such as lagging curriculum, weak practice, and shortage of teachers, it is proposed to build a modular curriculum group of "sharing at the bottom, separation at the middle, and mutual selection at the top", deepen school-enterprise collaboration, and embed real projects and technical standards. By building a shared practice platform and optimizing the "dual-teacher" structure, we will promote the integration of science and technology innovation, industry and innovation, and achieve a shift from knowledge imparting to ability-based. Take Harbin Institute of Information Engineering as an example to explore new models of education that can be promoted, enhance students' engineering capabilities and job fit, and provide precise talent support for the digital economy.

Keywords: High-quality employment; Professional course groups; Innovative approaches

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1.The significance of high-quality employment for the cultivation of Applied private talents

High-quality employment has become the core yardstick for measuring the effectiveness of private applied universities and the fundamental driving force for the systematic transformation of talent cultivation models.

Its significance is mainly reflected in three dimensions: individual growth, educational innovation and social service:

1.1 Individual growth dimension: Reinventing the competency map to achieve the leap from "skill operation" to "innovative development"

① Transformation of competency structure: Breaking through the limitations of traditional single-skill training, students are required not only to have a solid theoretical foundation and excellent practical skills, but also to have interdisciplinary comprehensive qualities, the ability to solve complex engineering problems, as well as resilience and sustainable development potential to adapt to rapid job changes. The talent positioning has shifted from a mere "skill operator" to a "technology innovator" with the ability to respond to industrial digitalization.

② Substantial enhancement of professional competitiveness: By building an integrated training system of "theory + practice", students hone their innovative thinking in real enterprise projects, internship scenarios and the transformation of scientific research achievements. This immersive experience not only enhances professional competence, but also helps students achieve precise positioning in their career development, enabling them to have

Author's Profile: Yufeng Zhang (1982-), female, Han ethnicity, Harbin, Heilongjiang Province. Lecturer,Master's degree,Career Aptitude Evaluator and Coach, Senior Career Counselor, Innovation and Entrepreneurship instructor. Research direction :Career and Employment Education.

Lingwei Meng(1986-), female, Han ethnicity,Harbin, Heilongjiang Province. Lecturer,Master's degree,Intermediate Career Counselor. Research direction:Innovation and Entrepreneurship Education.

Renchen Wang (1988-), male, Han ethnicity,Harbin, Heilongjiang Province. Lecturer,Master's degree,Innovation and Entrepreneurship instructor. Research direction:Research on Military Physical Training Pedagogy.

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stronger core competitiveness and bargaining power in the job market.

③ Optimization and upgrading of employment structure: Stimulating students' entrepreneurial awareness and innovative spirit, enabling them to grow from passive job "fillers" to "creators" of new business forms, thereby optimizing the quality of individual employment at the micro level and enhancing the high-level level of the overall employment structure at the macro level.

1.2 Dimension of educational innovation: Forcing system reconstruction and promoting the transformation from "subject-based" to "demand-oriented"

① Dynamic adaptation of curriculum content: Prompt universities to establish agile response mechanisms based on "professional course groups". Through deep collaboration with industry leaders and research institutions, capture the cutting-edge technology and industry standards in real time, embed real enterprise projects and the latest technology standards into the curriculum system, address the pain point of teaching content lagging behind industrial development, and achieve "resonance" between educational supply and market demand.

② Effective innovation of teaching models: The industry-university-research collaboration platform provides scenario support for the innovation of teaching methods. Promote the implementation of case-based teaching, project-based learning (PBL), flipped classroom and other models in the curriculum group, enhance the interactivity and practicality of learning, and ensure that the talents cultivated have both an international perspective and the real ability to solve practical problems.

③ Optimization and integration of resource allocation: Encourage schools to break down traditional disciplinary barriers and reorganize professional clusters. With the aim of high-quality employment, reallocate teaching staff, laboratories and resources for school-enterprise cooperation, and build a "school-enterprise community of shared future" to fundamentally enhance the pertinence and adaptability of talent cultivation.

1.3 Social dimension: Empowering industrial upgrading and building an ecosystem from "talent support" to "innovation-driven"

① Accelerate the transformation of scientific and technological achievements: Through the deep integration of industry, academia and research, universities become the core hubs for knowledge innovation and transformation. High-quality applied talents can quickly transform academic achievements into real productive forces, facilitate the cultivation of emerging industries, and drive technological iteration and model innovation in traditional industries.

② Enhancing the industrial chain and value chain: The injection of a high-quality talent pool effectively stimulates the vitality of market entities and promotes the extension of the industrial chain and the enhancement of the value chain. This not only alleviates the structural contradiction of "difficulty in recruitment" for enterprises, but also provides a solid intellectual support for the innovation-driven development of the regional economy.

③ Serve national strategic needs: Eventually form an organic connection between the "education chain, talent chain and industrial chain, innovation chain". By delivering high-quality talents with innovative spirit and practical ability, we will promote the transformation of the economic growth mode, inject continuous impetus into the high-quality development of the economy and society, and achieve a win-win situation of educational benefits and social benefits.

2.The problems faced by the professional course group of applied engineering talents

2.1 There is a mismatch between the curriculum system and market demand

Take the software technology major of Harbin Institute of Information Engineering as an example. This field is known for its rapid development and continuous innovation, with new tools and technologies emerging one after another, constantly injecting vitality into economic and social development. However, in the practice of building the software technology professional group, many applied colleges, including Harbin Institute of Information Engineering, still face the severe challenge of lagging behind the development trend of the industry in the construction of the curriculum system. First, it is difficult to grasp the proportion between traditional basic courses

and emerging technology courses, resulting in a disconnection between the skill stack mastered by students and the actual market demand, seriously weakening their employment competitiveness and career development potential. Second, the long-term nature of educational policy adjustments and the revision of talent development programs, as well as the lack of timeliness and flexibility in curriculum system reform, make it difficult for new tools and technologies in the industry to be quickly and comprehensively incorporated into the teaching content. Third, the concept of high-quality employment has not been deeply integrated into the entire process of curriculum system construction. The curriculum design has not been optimized closely around students' career development plans and job growth paths, resulting in a significant "misalignment" between theoretical knowledge imparting and market demand, with a low degree of matching.

2.2 Weak integration and utilization of practical resources under employment orientation

While educators are committed to integrating research platforms, teaching facilities and faculty, and are trying to empower students' career development by introducing real industrial resources, they still face severe challenges in the integration and utilization of employment-oriented practical resources.

First of all, there is a lack of systematicness in resource integration. The failure of schools to closely integrate with job requirements for top-level design has led to fragmented and systematic practice resources for each major, and the scarcity of high-quality social practice resources has seriously hindered students' process of transforming theoretical knowledge into practical skills. Secondly, the efficiency of resource utilization is low. Due to the lack of evaluation mechanisms and management systems, there are frequent instances of unreasonable resource allocation: on the one hand, the utilization rate of laboratory equipment is not high, resulting in idle waste of resources; On the other hand, the design of practical training projects is outdated and lacks pertinence and innovation. Finally, the hardware support is out of step with the industry. Many schools have insufficient practice facilities, and the pace of equipment updates and iterations lags far behind the development of the industry, leaving students with no access to cutting-edge technologies for full practice. Coupled with the rigid setting of practical teaching links, there is a "skill gap" for students in the transition from on-campus training to enterprise positions, which makes it difficult to truly achieve the deep integration of theory and practice and meet the demands of high-quality employment.

3.Collaborative innovation mechanisms and implementation effects of Curriculum groups Based on the goal of high-quality employment

3.1 Build a dynamically adjusted curriculum system to achieve precise alignment of teaching content with industry standards

In response to the severe challenges of rapid technological iteration in the software technology industry and the lagging response of traditional curriculum systems, Harbin Institute of Information Engineering should break the inertia of long-term revision and establish a new mechanism for curriculum construction featuring "agile response and dynamic adaptation" to ensure that talent cultivation resonates with the cutting-edge of the industry. First, form a "industry-education integration" course construction team and establish an agile market demand perception mechanism. Change the past closed model where only teachers within the school formulate plans, and form a curriculum construction team composed of experts from leading enterprises in the industry, senior technical backbones and professional leaders. Establish a regular market research mechanism, focus on the upstream and downstream of the software industry chain, and deeply analyze the core competency map of emerging typical positions such as data analysts, system architects, cloud-native developers, full-stack engineers, etc. Second, build a "modular, building-block" dynamic curriculum system to solve the problem of lagging reform. To overcome the drawbacks of the long revision cycle and lack of flexibility of the talent training program, a modular curriculum reform of "sharing at the bottom, separation at the middle, and mutual selection at the top" will be implemented. Break down disciplinary barriers and promote the deep integration of software engineering with artificial intelligence, big data and information technology. Based on the production-oriented training bases jointly built by schools and

enterprises, introduce the real project case library of enterprises and design multi-level practical projects from "basic verification" to "comprehensive innovation". Through the two-way flow of "enterprise mentors in the classroom and school teachers in the enterprise", the real R&D processes, version control norms and quality standards of enterprises are directly integrated into the entire teaching process, allowing students to adapt to the enterprise-level development environment during their school years. Third, through the main thread of "high-quality employment", achieve a precise match between the course objectives and the career growth path. Integrate the concept of high-quality employment deeply into the entire life cycle of curriculum design, shifting from "knowledge indoctrination" to "vocational ability enhancement". Full-cycle career planning embedding: Reconfigure the curriculum logic based on the career growth patterns of students from freshman to senior year. Lower grades focus on career cognition and basic qualities, middle grades emphasize core skills for positions and project practice, and upper grades focus on comprehensive training and on-the-job internship. Course assessment will no longer rely solely on test papers. Instead, enterprise-level project delivery evaluation will be introduced to focus on students' practical abilities in solving complex engineering problems, teamwork, and technological iteration. At the same time, students are encouraged to translate research results into employability by participating in corporate lateral projects, software development competitions and patent applications.

3.2 Shift from "supply-driven" to "demand-driven" curriculum design

Instead of being confined to the traditional binary thinking framework of "knowledge imparting" and "skills training", we should focus on the cultivation of engineering problem-solving ability, innovative thinking and comprehensive quality in response to the pain points of "ambiguous goals, disconnected content and single evaluation" in the curriculum design of applied undergraduate colleges. Build a new ecosystem of education that enables students to "see growth, desire challenges, and take the initiative to iterate". The first set of high-level standard formulation competency map: Upgrade from "able to operate" to "understand principles, design, and optimize". The course content should align with the cutting-edge technologies in the industry (such as AI +, green manufacturing, etc.), making students realize that what they are learning is the key to solving the pain points of future industries, thereby generating self-motivation to "master core technologies". Second, break the chapter restrictions and transform enterprise research and development topics and technological innovation challenges into "big unit" teaching projects. Teachers shift from "lecturers" to "project mentors" and students from "listeners" to "project partners". In the process of solving real problems, students naturally develop active learning behaviors such as consulting materials, consulting experts, and working in teams. Third, implement the integrated evaluation of courses, certificates, competitions and innovation: directly exchange industry authority certificates, high-level competition awards and innovation and entrepreneurship achievements for course credits or as core evaluation indicators. Use digital means to document the growth trajectory of students in dimensions such as communication and collaboration, innovative thinking, and professional quality, allowing students to clearly see their "added value" part and stimulating the sense of achievement drive of "I want to become stronger". Third, through a clear profile of the position and practical incubation of the creation, guide students to tailor personalized growth paths based on their own interests. Encourage students to boldly try and make mistakes in competitions and practices, and view failure as an inevitable part of growth, thereby protecting and stimulating their curiosity and desire to explore.

3.3 Build shared practice platforms to facilitate cross-disciplinary collaboration and real project implementation

In the current complex job and employment development environment, the theories and skills of a single major are no longer sufficient to cope with the diverse reality challenges. Solving practical problems often requires breaking down disciplinary barriers and achieving the integration of cross-professional knowledge and deep collaboration among talents from multiple fields. To do this, we must move from "resource silos" to "shared ecosystems" by building shared practice platforms.

First, the operation of the platform needs to rely on strict institutional norms, by clarifying the responsible entities for resource use, standardizing operation procedures and maintenance mechanisms, to ensure that the governance of the platform has rules to follow and evidence to rely on; At the same time, build a multi-dimensional evaluation system covering student satisfaction, resource utilization efficiency, project output quality and teacher feedback to drive the continuous iteration and optimization of the platform with data. On this basis, deepening industry-education integration is the key path to platform empowerment: on the one hand, establishing strategic synergy between schools and enterprises through "agreement co-construction", universities output research and development intelligence and talent reserves, and enterprises inject real cases and internship scenarios; On the other hand, "base co-creation" is implemented, where research and development centers or joint laboratories are built on campus, with enterprises investing in equipment funds, universities organizing scientific research breakthroughs, and guiding students to directly participate in the exploration of cutting-edge technologies; In addition, implement the "talent co-cultivation" mechanism and promote the "order-based" training model, allowing enterprises to deeply participate in the formulation of talent training programs and curriculum reconstruction (such as adding a smart logistics course to the logistics major), truly align the curriculum content with occupational standards and the teaching process with the production process, thereby ensuring that graduates can quickly adapt to the cutting-edge demands of the industry, Form an organic connection between the education chain, the talent chain and the industrial chain.

References:

[1] Strategies and Effects of the Reform and Innovation of the Computer Software Technology Professional Group Oriented towards Employment[J].Journal of Hubei Open Vocational College,25,38:15-17.

[2] Zhai Fuqiang,Ding Mingde,Chen Xihao,et al.Research on the Path of Cultivating innovative and entrepreneurial Talents in Colleges and Universities Based on Industry-University-research Collaboration mechanism[J].University, 2024(13):129-132.

[3] Practice and Research on Empowering Undergraduate Engineering Students'Professional Competence through University-Enterprise Collaborative Education,[J].Industrial and Information Technology Education,2025(11):6-10.

[4] Qu Haicheng,Sun Ning,Liu Lamei.Reform and Practice of Enhancing Practical Ability of Software Engineering in the Context of New Engineering[J].Journal of Higher Education,24,10(15):133-137.