Construction of the “Four Ones” Practical Education System for Graduate Students at Ordinary Universities from the Perspective of New Quality Productive Forces

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Abstract—Based on the urgent demand for high-level applied talents driven by the development of new quality productivity forces, this paper explores innovative approaches to the practical education system for graduate students in ordinary universities. The research proposes a “Four Ones” practical education framework—“One Curriculum Innovation,” “One Platform Carrier,” “One Mentorship Team,” and “One Transformation Mechanism”— aiming to address critical challenges in traditional graduate education, specifically the theory-practice disconnect and inadequate innovation capacity. By systematically elaborating on the construction logic and implementation strategies of the “Four Ones” system, it provides theoretical and practical paradigms for ordinary universities to cultivate high-quality talents adapted to the development of new quality productivity forces.

Keywords—*New Quality Productivity Forces; Postgraduate Education; Practice Education; General Education College*

I. INTRODUCTION

With the acceleration of the new round of scientific and technological revolution and industrial change, the new quality productivity led by scientific and technological innovation is reshaping the global competition pattern. General Secretary Xi Jinping emphasized that “To seize the historic opportunities presented by the scientific and technological revolution, it falls upon our higher education system to spearhead the reinvention of disciplinary frameworks and talent cultivation paradigms. Only through such systemic reforms can we forge the vanguard of innovators required to propel new-quality productive forces and secure high quality development for our nation.” Within this context, graduate education—as the primary front for cultivating high-level innovative talents—is positioned to assume greater significance. However, the current postgraduate training in general colleges is still facing problems such as insufficient depth of integration of industry and education, weak cultivation of practical and innovative abilities, and a single evaluation system, which makes it difficult to meet the needs of the new productive forces for a “new type of workers.”

The caliber of general colleges directly impacts regional innovation capacity and industrial upgrading. Thus, they are positioned as integral components of China's graduate education ecosystem[1]. Compared with the “Double First-Class” colleges and universities, general colleges have certain gaps in scientific research platforms, faculty strength, etc. But they also have the unique advantages of being close to the local industry, adjusting specialties flexibly, and strengthening the application orientation. The critical issue in graduate education reform at general colleges has been identified as leveraging their uniqueness to construct practice-oriented cultivation systems tailored to the demands of new quality productivity forces[2].

To this end, cultivating high-caliber talents with innovative mindsets and executive competence is recognized as the paramount objective of practice education in higher education. This paper focuses on the “Four Ones” practical education system to explore how to empower graduate education with new quality productivity and promote the in-depth adaptation of the education model to the needs of the times.

II. INTRINSIC COUPLING OF NEW QUALITY PRODUCTIVITY AND PRACTICAL EDUCATION SYSTEM

The new quality productivity, as a form of productivity with science and technology innovation as the core driving force[3].The postgraduate practice education aims to cultivate innovative and application-oriented talents, and these two concepts are deeply coupled in value orientation and jointly serve the national innovation-driven development strategy.

A. Isomorphism of value objectives

The evolution of new quality productivity forces is conceptualized as centering on productivity leaps achieved through knowledge innovation and technological breakthroughs, ultimately facilitating sustained technological advancement and the formation of a high-caliber talent ecosystem[4].To fulfill new-quality productive forces’ demand for tripartite synergy of innovation, talent, and industry, the graduate practical education system is conceptualized to integrate theoretical knowledge with industrial imperatives through industry-academia integration and project-based praxis. For example, the practice platforms built by universities around artificial intelligence and new energy represent precise alignment with key areas of the new quality productivity. Both the platforms and these key areas share the ultimate goal of “transforming the effectiveness of innovation.”

B. Interactivity of elemental synergies

The core elements of new quality productivity (data, technology, and knowledge) interact dynamically with the core aspects of graduate student practice and education (curriculum design, research training, and industrial practice).On the one hand, the new quality productivity provides real scenarios for practical education; For instance, smart factories and digital twin technology serve as practice carriers for graduate students to solve complex engineering problems. On the other hand, graduate students' research outcomes—such as patents and algorithm optimizations—feed into enterprises' technological upgrading, forming a closed loop of "practice-innovation-productivity enhancement." For example, in the biomedical field, corporate R&D participation by graduate students has accelerated the translation of gene editing technology from laboratory to industry[5].

C. Complementarity of operating logic

The new quality of productive forces requires breaking away from traditional production modes characterized by over-reliance， and the postgraduate practical training system—through innovative mechanisms such as interdisciplinary teams and school-enterprise joint tutorship—breaks down disciplinary barriers while solving the disconnection between industry and education.

For example, a university's "Intelligent Manufacturing" special class integrates resources from multiple disciplines (e.g., mechanical engineering, computer science, and management), training students who have led industrial Internet transformation projects. This demonstrates the composite capabilities essential for new productivity.

III. THE CONSTRUCTION PATH OF THE "FOUR ONES" PRACTICAL EDUCATION SYSTEM

As an important position of postgraduate education, general colleges need to build a "four ones" practical education system based on their own characteristics, in order to respond to the needs of the new quality productivity forces on the practical ability of talents and innovative literacy.

A. A Curriculum Innovation: Driving Creative Capacity Development with Higher Order Learning

Curriculum innovation, as the foundation of practical education, needs to break the traditional knowledge-inculcation mode while incorporating both the scientific/technological dimensions of new quality productivity and the ideological/political requirements[6]. For example, a university's case teaching on waste textile recycling utilizes blended pedagogy—combining MOOC platforms with offline flipped classrooms across disciplines—and introduces AI/big data tools to advance interdisciplinary knowledge integration. Furthermore, course ideology should be embedded through infusing professional curricula with public spirit and scientific ethos. Initiatives like University X's "Mingde Lecture Hall" and "Red Sail Pioneer Class" exemplify this approach, achieving dual cultivation of rational cognition and emotional resonance. Furthermore, graduate programs are ideally positioned to adopt problem-oriented practices: using industrial pain points (e.g., "choke point" technologies) as project topics enhances students' capacity to resolve real-world challenges.

B. A Platform Carrier: Building a Practical Ecology of Digital Intelligence for Industry-Education Integration

As a bridge connecting theory and practice, platform entities have integrate multiple resources to achieve synergistic effects[7].On the one hand, there are joint university-enterprise laboratories and industrial bases, such as the school-land-enterprise joint school-running mode built by a university and an industrial cluster area. On the other hand, there is a digital teaching and research platform, which uses cloud computing, virtual simulation and other technologies to build an intelligent practice platform to support remote collaboration and resource sharing. For example, through big data to analyze students' performance in practice and optimize training programs[8]. In addition, it should make full use of the international academic exchange network and introduce the world's top educational resources, such as the German Engineer Training Model and the Japanese Joint Degree Mechanism, so as to broaden the international vision of students.

C. A Mentoring Team: Creating a Dual Mentoring Community of "academics + practitioners"

Breaking the limitations of the traditional single-tutor system and establishing diversified cultivation models are urgently required for mentoring teams. Adopting school and enterprise dual tutor system, the school tutor is responsible for academic leadership, the enterprise tutor focuses on practical guidance, such as Fuzhou University "five-in-one" tutor education system, covering academic, mental health, career development and other dimensions. For cross-cutting topics, an interdisciplinary tutor group is established to form a team of tutors with multidisciplinary backgrounds, so as to strengthen the collaborative innovation capability[9].In addition, there are also incentive mechanisms for young mentors to attract young scholars with international perspectives through policy support and tilting of resources, such as the "Young Innovative Talent Discovery Mechanism" proposed by Northeast Forestry University.

D. A Transformation Mechanism: Realizing the Closed Loop of "Research-Industry-Benefit"

The transformation mechanism of outcomes represents the ultimate realization of educational value in practice. This entails establish multi-dimensional evaluation criteria, cultivation support systems, and continuous monitoring mechanisms. The path of construction includes the first step of implementing innovative ways of recognizing degree results by replacing the dissertation with practical results. For example, allowing masters of engineering to apply for a degree with product design, technical solutions, and so on. Establishment of categorized evaluation criteria, it can be proposed that the Master of Education can graduate through three types of practical results: research report, case study report and application design report. The second step is to build an incubation system. In order to ensure the continuous iteration of technology, we have established the "academic relay" mechanism, through which senior students lead junior students to "pass on", and at the same time, relying on the industrial resources of enterprises, we provide entrepreneurial support platforms such as funds, venues, and market docking support for students' entrepreneurial projects[10].The third step is to establish a results tracking and feedback mechanism. The economic and social benefits of the practice results are evaluated and tracked for benefits, and the training program is optimized in reverse according to the transformation of the results, forming a closed-loop management.

IV. IMPLEMENTATION GUARANTEES AND POLICY RECOMMENDATIONS

A. Institutional innovation: breaking down institutional barriers

Improve the policy support system. Formulate and refine the implementing rules for the Industry-Education Integration Promotion Regulations, specifying incentive policies including tax benefits and fiscal subsidies for enterprise participation in talent development. For example, enterprises that are deeply involved in joint school-enterprise training should be given a pre-tax deduction of 150 per cent of their investment in education expenditure; and a "special fund for the training of talents with new quality and productivity" should be set up to support the construction of platforms for the integration of industry and education in ordinary colleges.

Innovative management system and mechanism. Set up a physical operation of the "Industry-Education Integration Office", which is directly led by the vice president in charge and coordinates the school-enterprise cooperation [11]. The office should be equipped with 5-8 full-time staff members and an annual budget of not less than 3 million yuan; The implementation of the "dual dean system", whereby industrial colleges are co-directed by university professors and corporate executives, with the corporate deans enjoying the same decision-making power. For example, the deputy dean of a university's School of Engineering Excellence participates in the development of training programs, selection and hiring of faculty and other major decisions; the establishment of flexible academic management, allowing graduate students to complete their studies in stages according to the needs of the project. The practice period can be cumulatively counted as years of study, with a maximum extension of six years.

B. Resource Integration: Building a Collaborative Nurturing Ecology

In-depth sharing of resources between universities and enterprises. The implementation of the "equipment-sharing voucher" system, whereby the Government buys equipment from enterprises for a period of time, and universities use the vouchers to use the enterprises' production lines, testing instruments. It is proposed that 200 million yuan of special funding be arranged annually to cover the opening up of equipment in 1,000 enterprises. For example, the Yangtze River Delta Engineering Education Alliance has built a sharing platform containing 5,000 engineering cases and 200 high-quality courses. It has implemented the "Enterprise Data Openness Program", which uses desensitized production data for teaching and research under the premise of ensuring commercial confidentiality. It is proposed that the first batch of operational data of 100 typical production lines in the smart manufacturing industry be opened up.

To build a regional collaborative network, the "New Quality Productivity Talent Cultivation Alliance" has been established, uniting universities, leading enterprises, and research institutes across the region. This alliance should institute a permanent secretariat and organize at least four annual industry-education integration sessions. Additionally, it must establish an inter-university credit mutual recognition mechanism, ensuring member institutions acknowledge each other practical course credits—as demonstrated by 23 universities in the Yangtze River Delta's, which have implemented shared access to engineering master's courses with over 5,000 mutually recognized credits.

C. Evaluation reform: creating multiple incentives

Innovative student evaluation system. Implement the Competency Portfolio system to document students' authentic project engagement, problem-solving efficacy and innovative outcomes. The file have to include multiple evidences such as video recordings and enterprise evaluations, instead of a single thesis evaluation. The "one-vote approval system for enterprises" should be implemented, and enterprise supervisors should have substantive veto power over the results of practice. A university has implemented a "double-blind assessment" system in which 40% of the score is given by enterprises. A "practical achievement point system" has been established to quantify the benefits of technological transformation and the value of patents as graduation requirements. For example, it has been stipulated that graduate students of professional degrees need to accumulate 100 practice points before they can defend themselves.

D. Organizational safeguards: building a two-tier promotion mechanism

Designating accountable leadership, responsible departments and milestone schedules. Integrating practical education development into institutional priority tasks, it is considered to be the primary organizational assurance mechanism at the school level. It is recommended that the annual report on the duties of the president be included as a mandatory part of the report. The establishment of "enterprise participation" performance appraisal indicators, included in the annual evaluation of faculties and departments. Indicators should include quantifiable elements such as the amount of funds invested by enterprises and the number of practical positions provided. The establishment of "professorships for integration of industry and education" and the hiring of technical backbones from enterprises as full-time teachers. The number of positions should be no less than 5% of the full-time faculty and the annual salary should be based on corporate levels.

Establishing a joint industry-academic "Practical Education Steering Committee" with institutionalized monthly curriculum optimization reviews constitutes the core organizational assurance mechanism at the departmental level. The proportion of enterprise representatives on the committee should not be less than 40%. Implement the "Dual Mentor Pairing Program", whereby each on-campus mentor establishes a regular cooperative relationship with at least one enterprise mentor. Twinning is included in the tutor's assessment and is linked to enrollment targets. Establishment of "Dynamic Updating Mechanism for Practical Projects", adjusting 20% of the practical content every semester according to the development of industrial technology. Updates need to be validated by business experts before implementation.

CONCLUSION

Within the framework of new quality productivity forces, ordinary colleges and universities have to align their "Four Ones" practice training systems with emerging productivity demands. By synergistically innovating curricula, platforms, teams, and mechanisms, these institutions can effectively resolve chronic issues in traditional postgraduate education—including the overemphasis on research at the expense of practice, and the disconnection between industry and academia. Moving forward, policymakers should strengthen support measures to deeply integrate the education, industrial, and innovation chains. This integration will provide sustainable talent development essential for serving national strategies and cultivating new quality productivity.

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