

Research on Optimization of Training Path for Top-notch Innovative Talents Driven By New Quality Productive Forces

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Abstract: The rise of new quality productive forces has given birth to new production relations and profoundly changed the training mode of top-notch innovative talents. In order to meet the development needs of the new quality productive forces, it is urgent to build a "student-centered" training mode for top innovative talents. However, the current training model of many colleges and universities fails to fully consider the individual differences of students and the barriers of teacher-student interaction under the existing teaching methods. Therefore, only by constructing a model combining individualized teaching and classified training can we maximize students' subjectivity, stimulate their learning motivation, and promote independent learning, collaborative learning and inquiry learning.

Keywords: New Quality Productive Forces; Top-Notch Innovative Talents; Teach Students According to Their Aptitude; Path Optimization

1. Introduction

In recent years, China has clearly put forward the strategic goal of developing new quality productive forces, which is closely related to scientific and technological innovation and industrial upgrading. "New quality productive forces" is a new form of productive forces after the information technology revolution and based on the industrial revolution. It relies on the traditional basis of productive forces, develops continuously with new knowledge forms, information means and organizational modes, and has a profound impact on education [1]. On the one hand, the new

quality productive forces promotes the rapid updating and iteration of educational content, making it able to keep up with the pace of The Times; On the other hand, it takes knowledge as the core and gives birth to new production relations, thus changing the existing education system and teaching methods. In this context, talent has become an important promoter and leader of new quality productive forces, and a high-quality talent team is an important guarantee for high-quality economic and social development [2]. The cultivation of top-notch innovative talents is "a key move to meet the demand for new quality productive forces", so the whole chain from basic education to higher education needs to be reformed. New quality productive forces requires education to adjust and optimize the elements of talent training objectives, curriculum Settings, teaching content and methods according to the law of talent training, so as to give full play to the main role of students, stimulate learning motivation and achieve all-round development. Specifically, it is necessary to re-examine the teaching concept and method, establish a curriculum system that conforms to the law of training innovative talents, and reform the traditional single assessment method. Therefore, it is urgent to build a new top-notch innovative talent training model that takes students as the center, teaches students according to their aptitude, classifies development and integrates production and education. However, the existing talent training mode is still insufficient in the aspects of goal, concept and approach, and does not fully reflect the uniqueness and difference of top-notch innovative talents. From the perspective of new quality and productivity, this paper discusses the problems faced by the current training mode of top-notch innovative

talents and their causes, and puts forward the corresponding optimization paths and methods.

2. The Reform Status and Problems of the Training Mode of Top-Notch Innovative Talents

Although China has made beneficial exploration in the cultivation of top-notch innovative talents in recent years, there are still several deficiencies that need to be addressed.

2.1 The Top-Level Design of Training Top-Notch Innovative Talents Needs to be Improved

The cultivation of top-notch innovative talents is a complex systematic project involving multiple dimensions and links, which requires overall planning and collaborative design from multiple aspects such as educational concept, training objectives, curriculum system, teaching methods, teaching staff and evaluation mechanism. At present, although China has carried out a series of reform attempts in the field of higher education, most of the measures are still limited to the adjustment of local links, lack of systematic and coherent top-level design. Taking the curriculum system reform as an example, some universities have explored and implemented the "master and master" through training mode, aiming to break the traditional division of academic segments and realize the vertical connection of talent training. However, in practice, due to the restriction of disciplinary barriers, the curriculum of different education stages often operates independently, failing to form an organic cohesive knowledge system. There is a lack of effective transition between the general education in the undergraduate stage, the professional deepening in the master stage and the innovative research in the doctoral stage, and the progressive and relevant content of the course is insufficient. This fragmented reform is difficult to truly build a complete training chain to support the growth of top-notch innovative talents. In order to break through this dilemma, it is necessary to establish an interdisciplinary and cross-stage systematic training framework, open up all links of the whole process of talent training through institutional innovation, and form an organic and unified education system.

2.2 The Mechanism of Interdisciplinary Integration Needs to be Improved

At present, the curriculum of most colleges and universities still strictly follows the logic of a single discipline, and professional courses occupy an absolutely dominant position, while the proportion of interdisciplinary and interdisciplinary courses is low. There is a lack of effective course sharing mechanism among different departments, and students often face institutional obstacles such as difficulty in identifying credits and conflict of course time when they choose non-major courses. This kind of closed curriculum system leads to students' knowledge structure is limited to their own major field, and it is difficult to form a broad academic vision[3]. In emerging fields such as artificial intelligence, biotechnology, and new energy, science and technology are developing rapidly, but the pace of curriculum update in colleges and universities lags behind, and it is difficult to integrate cutting-edge knowledge into teaching in a timely manner. At the same time, truly interdisciplinary courses (such as "artificial intelligence + medicine" and "big data + social science") are limited in number and mostly optional, failing to become a core component of talent training. As a result, students lack the comprehensive ability to deal with complex real-world problems and meet the innovative needs of the future society.

Although some universities have tried to set up interdisciplinary experimental classes or joint training programs, the knowledge penetration between different disciplines remains at the surface level due to the limitations of discipline evaluation system, teacher structure and administrative management mode. For example, engineering students may only learn a few social science courses, while liberal arts students are less likely to develop key skills such as science and technology ethics and data thinking. This kind of shallow intersection is difficult to truly form a "comprehensive" knowledge system, which limits the growth space of top-notch innovative talents. Most of the existing curriculum systems adopt a fixed modular design, and students have less freedom to choose courses, making it difficult to flexibly adjust their learning paths according to their personal interests and development directions. In contrast,

world-class universities generally adopt the model of "core curriculum+ independent elective" to encourage students to explore across disciplines, while the curriculum system of Chinese universities still emphasizes unity and lacks flexibility in personalized training.

2.3 The Industry-University-Research System Needs to be Deeply Integrated

First of all, there is a clear disconnect between college talent training and the actual needs of enterprises. The traditional education model pays too much attention to the imparting of theoretical knowledge, but neglects the integration of cutting-edge technologies. Many colleges and universities are slow to update their major offerings and course content, which is difficult to reflect the latest developments in the industry in a timely manner, resulting in the knowledge structure of graduates lagging behind market demand.

Secondly, the industry-university-research cooperation mechanism has not been really opened up. Although some universities and enterprises have established joint laboratories or practice bases, the cooperation mostly stays at the surface level and lacks deep integration. The enthusiasm of enterprises to participate in personnel training is not high, the conversion rate of scientific research achievements in colleges and universities is low, and the research direction of scientific research institutions is not enough to match the actual needs of the industry, forming a split situation of "colleges and universities are immersed in research and enterprises start from scratch"[4]. In addition, the practical teaching system has obvious defects. Experimental courses mainly focus on verification experiments and lack comprehensive and innovative experimental projects. Innovation and entrepreneurship education is often a mere formality, staying in superficial training such as business plan writing, and it is difficult for students to get real engineering practice and scientific research experience. According to a survey, more than 60 percent of engineering graduates said they lacked opportunities to participate in real projects during their college years.

The drawbacks of this training model are becoming increasingly apparent in the digital economy. With the rapid development of new quality productive forces, the demand for interdisciplinary talents with interdisciplinary

knowledge, innovative thinking and practical ability is surging. Taking the integrated circuit industry as an example, it not only needs professionals who master microelectronics technology, but also needs cross-boundary innovative talents who are familiar with multi-field knowledge such as material science, equipment manufacturing, and EDA tools.

2.4 The Traditional Teaching Mode Needs to be Changed Urgently

At present, the teacher-centered "cramming" teaching mode is still widely adopted in the classroom teaching of higher education in China, which seriously restricts the training of top innovative talents. It is manifested in the following dimensions [5]:

First of all, in the form of classroom organization, one-way infusion teaching still occupies a dominant position. As the absolute authority of knowledge, teachers transmit the established knowledge system to students by "filling the classroom", while students passively accept, memorize and repeat. According to relevant surveys, more than 70% of undergraduate classes are still dominated by teachers, and the interaction time between teachers and students is less than 15% of class hours. This teaching mode leads to students' cognition staying at the level of memory and understanding for a long time, and it is difficult to develop into the higher-order thinking stage of application, analysis and creation.

Secondly, the application of modern teaching methods is obviously insufficient. Although the educational community has been advocating heuristic, project-based and inquiry-based teaching, in actual teaching, the application of these methods is often mere formality. Problem-Based Learning (PBL) teaching is only carried out in a few experimental classes, and inquiry-based learning based on real research projects is mostly limited to the graduate level. Most of the classes lack effective discussion design and thinking guidance, and students' critical thinking and innovation ability can not be systematically trained.

Third, the teaching evaluation method is unitary and rigid. The existing assessment system overemphasizes standardized tests and knowledge reproduction ability, and lacks effective assessment of innovative thinking

and problem solving ability. This evaluation orientation further strengthens the inertia of test-oriented education, making students accustomed to looking for standard answers rather than exploring multiple solutions.

The direct result of this teaching mode is that students' academic curiosity and research enthusiasm are suppressed, and their independent learning ability and cooperative exploration consciousness are weak. In the critical period of the growth of top-notch innovative talents, their questioning spirit, innovative consciousness and independent research ability which should be cultivated are not fully developed.

3. Optimize the Training Path of Top-Notch Innovative Talents

3.1 The Systematic Reform and Multi-Subject Coordination Mechanism of Top-Notch Innovative Talent Training

The cultivation of top-notch innovative talents is a systematic project, involving the multidimensional reform of the education system. From the micro level, the traditional education concept needs to be reformed, from "knowledge infusion" to "ability shaping"; Reform the teaching mode, promote the heuristic, inquiry, project teaching; Restructure the curriculum system and strengthen cross-disciplinary integration[6]. From the middle perspective, it is necessary to strengthen the construction of teaching staff and cultivate a team of tutors with international vision and innovative ability. Increase financial input to provide sufficient resources for innovative experiments and scientific research training; We will improve the evaluation mechanism and establish a multi-dimensional evaluation system with innovation quality as the core.

More importantly, fostering top-notch innovation talents requires a sound policy environment and social support system. The government should play a leading role, formulate special support policies, improve the talent incentive mechanism, and build a platform for industry-university-research collaboration. Enterprises should be deeply involved in talent training and provide practice bases, research and development projects and industry mentor resources. Social organizations can play a unique role in

international exchanges, competition activities and innovation incubation. As the main training ground, schools should establish flexible academic system, interdisciplinary training programs and personalized development paths. Teachers need to change their role and become the guide of innovation. Students should enhance their subjective consciousness and take the initiative to participate in scientific research practice.

The diversified and coordinated training mode of "government, industry, university, research and application" can integrate the superior resources of all parties and form an ecological system for personnel training. Only through systematic reform and multi-party cooperation can we truly break through the limitations of the traditional education model and cultivate top-notch innovative talents who can meet the needs of the development of new quality productive forces.

3.2 Optimize the Training Mode of Top-Notch Innovative Talents by Combining Teaching and Learning in Accordance with Their Aptitude

The development of new quality productive forces makes China in urgent need of a group of top-notch innovative talents to meet the major strategic needs of the country, and requires the establishment of student-centered training mode. However, due to the influence of the traditional educational concept and the unbalanced economic and social development, there are great differences in the educational goals, contents and methods of students in different regions and at different levels in China. Some students cannot fully play their potential and the learning effect is not ideal. Therefore, colleges and universities should actively explore new training models and realize personalized training by teaching students according to their aptitude[7]. In the process of implementation, we should focus on the following aspects: First, pay attention to the individual differences of students, analyze the needs and characteristics of students from different levels, and carry out targeted teaching; Second, we should pay attention to teaching students according to their aptitude, arrange courses and teaching content reasonably according to individual differences, and adopt targeted teaching methods; Third, to improve the comprehensive quality of teachers,

teachers must have solid professional knowledge, master advanced educational concepts and methods, and make appropriate adjustments to the curriculum to meet the needs of students; Fourth, strengthen collaborative education. Colleges and universities should strengthen cooperation with the government, enterprises and other parties, and make full use of all resources to optimize the training model. In a word, we should fully consider the differences of students in study and life, adopt differentiated, diversified and personalized teaching methods, and promote the all-round development of students.

3.3 Promote the Teaching Reform with the Goal of Stimulating Students' Initiative and Adapting Them to New Quality Productive Forces

In the era of knowledge as the core, students are not only the recipients of knowledge, but also the training objects of innovative consciousness and ability, and will play an important role in the future society. The education driven by the new quality productive forces must be student-centered, and the teaching idea and method should be re-examined. In the teaching concept, we should abandon the traditional teacher-centered mode and give full play to the initiative of students. Adopt the combination of online and offline teaching, give full play to the advantages of information technology, and cultivate the ability of independent learning and innovation consciousness[8]; Strengthen the cultivation of innovation ability and practical ability; Pay attention to the shaping of critical thinking and innovative thinking ability. In terms of teaching methods, it is necessary to change the traditional mode of lecturing and one-way indoctrination, and pay attention to the application of diversified teaching modes such as heuristic, interactive, inquiry and experience. For example, classroom discussion can be carried out in the form of group discussion and cooperative inquiry. Let students participate in the inquiry in the practice section; Adopt a variety of evaluation methods to make a comprehensive evaluation of students. In short, it is necessary to realize the transformation from teacher-centered to student-centered[9].

3.4 Establish a Curriculum System with Knowledge as the Core Content and in Line with the Law of Training Innovative Talents

The new quality productive forces emphasizes the basic role of "knowledge accumulation, production and innovation", as well as "soft" qualities such as "knowledge, skills, wisdom and way of thinking" in the training of innovative talents. The training mode of top-notch innovative talents should be based on the demand and application of knowledge, take knowledge as the foundation, take innovation as the core, take literacy as the goal, and establish a corresponding curriculum system, including the curriculum system of general education, the curriculum system of interdisciplinary integration, the practical teaching system and the curriculum system of innovation and entrepreneurship education. The curriculum should attach importance to the accumulation and application of knowledge, and form a comprehensive ability that combines "hard" quality with "soft" quality. At the same time, attention should be paid to the cultivation of various comprehensive abilities required by top-notch innovative talents, and the curriculum system should be constructed from two aspects: society and school. In the social aspect, reasonable demand analysis and career planning should be carried out for top-notch innovative talents. Schools should pay attention to the reasonable and effective selection and training of top-notch innovative talents.

3.5 Reform the Traditional Single-Purpose Examination Method and Adopt Diversified Assessment Methods

As an important means of testing students' learning effect and teaching quality, the traditional examination method has played an important role in knowledge transfer and ability assessment for a long time. However, with the rapid development of new quality productive forces, the social demand for talents is no longer limited to simple memorization of knowledge and test-taking ability, but pays more attention to innovative thinking, practical ability and comprehensive quality. Therefore, the single examination and assessment method can no longer fully reflect the true ability of students, and it is urgent to change to a more diversified evaluation system.

Driven by the new quality and productivity, the assessment method should break through the limitations of the traditional model and adopt the dynamic evaluation mechanism combining "result + process". Results-based assessment (final exams, papers, project results) can assess students' final mastery of knowledge, while process-based assessment (such as classroom discussion, lab reports, teamwork, innovative practice) can more comprehensively reflect students' thinking development, problem-solving ability and practical application level in the learning process. This diversified assessment method can not only measure students' comprehensive ability more scientifically, but also stimulate students' awareness of active learning and innovation potential.

In addition, the new quality productive forces requires that education and teaching content must be closely integrated with the needs of social development and economic construction, and the curriculum system should be set with knowledge as the core, while integrating interdisciplinary, cutting-edge technology and industrial practice content [10]. The traditional single examination mode can only test students' mastery of a given knowledge point, but cannot assess their knowledge transfer ability, critical thinking and innovation ability in real problems. For example, in emerging fields such as artificial intelligence, intelligent manufacturing and green energy, it is difficult to measure whether students have the ability to solve complex engineering problems with a simple theoretical examination, while assessment methods such as project-based learning, case analysis and enterprise practice can more effectively test students' practical application ability.

4. Conclusion

Training top-notch innovative talents is an inevitable requirement for the development of new quality productive forces and an important guarantee for high-quality economic and social development. From the perspective of new quality productive forces, this paper analyzes the existing problems and reasons of the current training mode of top-notch innovative talents, and puts forward optimization paths such as systematic reform, teaching according to aptitude, innovation of teaching methods, optimization of curriculum

system and reform of assessment methods. The research points out that the traditional teacher-centered teaching mode, single assessment method and fragmented curriculum design can no longer meet the demand of new quality productive forces for top innovative talents. By constructing the "student-centered" training mode, strengthening individualized teaching and classified development, and promoting interdisciplinary integration and deep collaboration between industry, university and research, students' innovation awareness and practical ability can be effectively stimulated, and high-quality talents can be provided to support the major strategic needs of the country. However, there are still some limitations in the research of this paper. For example, the connotation of top-notch innovative talent training mode driven by new quality productive forces has not been deeply discussed, and the implementation strategy of optimization path lacks specific analysis. Future research should further deepen the understanding of the connotation of new quality productive forces, explore the specific implementation strategies of the training mode of top-notch innovative talents, and combine the characteristics of different disciplines and fields to propose more targeted optimization plans. In addition, it is also necessary to strengthen the long-term tracking and evaluation of the training effect of top-notch innovative talents, so as to provide a scientific basis for the construction of the sustainable development of top-notch innovative talents training ecosystem.

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