Advances in Educational Technology and Psychology (2025)
Clausius Scientific Press, Canada

DOI: 10.23977/aetp.2025.090413
ISSN 2371-9400 Vol. 9 Num. 4

Exploration of the Mechanism and Countermeasures for Cultivating High end Talents with Technological Innovation

Cheng Wang

Haibo Innovation Technology (Dongguan) Co., Ltd., Dongguan, Guangdong, 523001, China

Keywords: Scientific and Technological Innovation; High-End Talents; Cultivation Mechanism; Education System; Practice Platform; Incentive Guarantee

Abstract: This article focuses on the important topic of cultivating high-end talents with scientific and technological innovation. At present, scientific and technological innovation plays a key role in national development, and the cultivation of such talents is of great significance. By combing the relevant theoretical basis, including human capital theory, talent growth theory and innovation theory, this article analyzes the training mechanism of education, practice and encouragement. At the same time, the paper points out that there are problems in curriculum and teachers in the education system, difficulties in posts and cooperation in the practice platform, and defects in evaluation and guarantee of incentives and guarantees. Based on the above analysis, it is suggested to improve the relevant mechanism from the following aspects: The education and training system should further optimize the curriculum and innovate teaching methods, and at the same time strengthen the construction of teachers; The practice platform needs to increase the number of posts and balance the allocation of resources to promote multi-party cooperation; The incentive guarantee system should establish a scientific evaluation mechanism, enrich incentive forms and improve supporting measures. The purpose of this article is to provide useful reference for the cultivation of high-end talents with scientific and technological innovation in China, and to promote the quality of talent cultivation.

1. Introduction

In today's era of rapid development of globalization and knowledge economy, scientific and technological innovation has become the core driving force to promote national and regional economic growth and enhance comprehensive competitiveness [1]. As the key carrier of scientific and technological innovation, the quantity and quality of high-end talents with scientific and technological innovation are directly related to the position of a country or region in the global scientific and technological competition pattern [2]. Having a high-quality team of innovative high-end talents in science and technology can not only promote cutting-edge scientific and technological achievements and accelerate their transformation, but also lead the development of emerging industries and promote the optimization and upgrading of industrial structure [3]. Therefore, strengthening the cultivation of high-end talents with scientific and technological

innovation is of great strategic significance for enhancing the national innovation ability and realizing sustainable development.

From an international perspective, countries all over the world have put the cultivation of high-end talents with scientific and technological innovation at the core of their national development strategies, introduced a series of preferential policies and measures, and actively competed for the global high-end talent resources [4]. In China, with the in-depth implementation of the innovation-driven development strategy, the demand for innovative high-end talents in science and technology is becoming more and more urgent. However, at present, China still faces many challenges in the cultivation of high-end talents with scientific and technological innovation [5]. In view of this, it is of great practical significance to deeply explore the training mechanism and corresponding countermeasures of high-end talents with scientific and technological innovation. The purpose of this article is to analyze the present situation and problems of the cultivation of high-end talents with scientific and technological innovation, and based on relevant theories, put forward targeted suggestions and practical countermeasures for optimizing the cultivation mechanism. It is hoped that this can provide a useful reference for the cultivation of high-end talents with innovative science and technology in China, and help China to occupy a dominant position in the global science and technology competition.

2. Science and technology innovative high-end talent training theory

The theory of human capital emphasizes that knowledge and skills acquired by people through education and training are an important capital, which can bring benefits to individuals and society. As a key way to enhance human capital, education investment plays a core role in the growth of high-end talents with scientific and technological innovation [6]. The investment of the state and society in scientific research and education will help to enhance the knowledge reserve and professional skills of talents and make them the core force to promote scientific and technological innovation. At the same time, individuals' investment decisions on their own education also affect whether they can grow into high-end talents with scientific and technological innovation.

The theory of talent growth points out that the growth of talent is a process influenced by many factors [7]. For high-end talents with scientific and technological innovation, their growth depends not only on internal factors such as personal talent and hard work, but also on the external environment. Good educational environment can inspire their innovative thinking, high-quality scientific research atmosphere can stimulate their desire to explore, and perfect policy support can provide them with development opportunities [8]. Innovation theory emphasizes the key role of innovation in economic and social development. As the main body of innovation, the cultivation of high-end talents with scientific and technological innovation is closely linked with innovation theory. Innovation theory encourages breaking through traditional thinking and carrying out creative exploration and practice. In the process of talent training, guided by this theory, it will help to create an atmosphere of encouraging innovation and tolerating failure, and stimulate the innovative vitality of talents.

3. Analysis on the training mechanism of high-end talents with scientific and technological innovation

The cultivation of innovative high-end talents in science and technology is a systematic project, which involves the cooperative operation of many mechanisms. The following is an in-depth analysis of three key mechanisms: education and training, practical exercise and incentive guarantee.

(1) Education and training mechanism

Education and training is the cornerstone of the growth of high-end talents with scientific and technological innovation. From the stage of basic education, we should pay attention to cultivating students' interest in science and technology and their spirit of exploration, so as to lay a good foundation for subsequent professional study [9]. The stage of higher education is a critical period. Colleges and universities need to build a perfect curriculum system, which should not only cover solid professional basic knowledge, but also offer relevant courses such as cutting-edge scientific and technological trends and interdisciplinary integration to broaden students' knowledge and horizons. It is very important to strengthen the construction of teaching staff. Excellent teachers can guide students to deeply understand professional knowledge and stimulate their innovative thinking.

(2) Practice exercise mechanism

Practical training plays an irreplaceable role in transforming theoretical knowledge into practical innovation ability. Scientific research institutions and enterprises should become an important platform for high-end talents with scientific and technological innovation to practice. Scientific research institutions have advanced experimental equipment and rich scientific research project resources, which can provide opportunities for talents to participate in scientific research practice in depth and enhance their innovation ability in the process of solving practical scientific research problems [10]. Enterprises are closer to the market demand, and talents can understand the market dynamics in enterprise practice, combine scientific research results with practical applications, and improve the ability to transform results.

(3) Incentive and guarantee mechanism

Effective incentive and guarantee mechanism is an important driving force to stimulate the enthusiasm and creativity of high-end talents with scientific and technological innovation. In terms of material incentives, reasonable salary and reward system for scientific research are essential. Giving talents salaries that match their contributions, and setting up awards for the transformation of scientific research achievements and project innovation can directly motivate talents to actively participate in scientific research and innovation. In terms of spiritual encouragement, we should create a cultural atmosphere of respecting knowledge and talents, commend and publicize outstanding talents, and satisfy their sense of accomplishment and honor. At the same time, a perfect guarantee mechanism is also very important, including good scientific research conditions, career development planning guidance and living security, so that talents can devote themselves to scientific and technological innovation.

4. Problems existing in the cultivation of high-end talents with scientific and technological innovation

Although China has made some achievements in cultivating high-end talents with scientific and technological innovation, it still faces many problems to be solved urgently. These problems are mainly reflected in the education system, practice platform and incentive guarantee.

(1) The lack of education system

At present, the education system is difficult to meet the needs of cultivating high-end talents with scientific and technological innovation in some aspects. In terms of curriculum design, the curriculum content of some colleges and universities is slowly updated, which is out of touch with the rapidly developing frontier of science and technology. Taking computer science as an example, the proportion of courses in emerging fields such as artificial intelligence and big data is relatively low, making it difficult for students to access the latest technical knowledge. At present, the teaching methods are more traditional, mostly based on teachers' lectures, and students passively accept knowledge, lacking the cultivation of students' innovative thinking and independent learning ability. In terms of teachers, the number of "double-qualified" teachers with rich practical

experience in the industry is insufficient to provide students with practical scientific research guidance (see Figure 1).

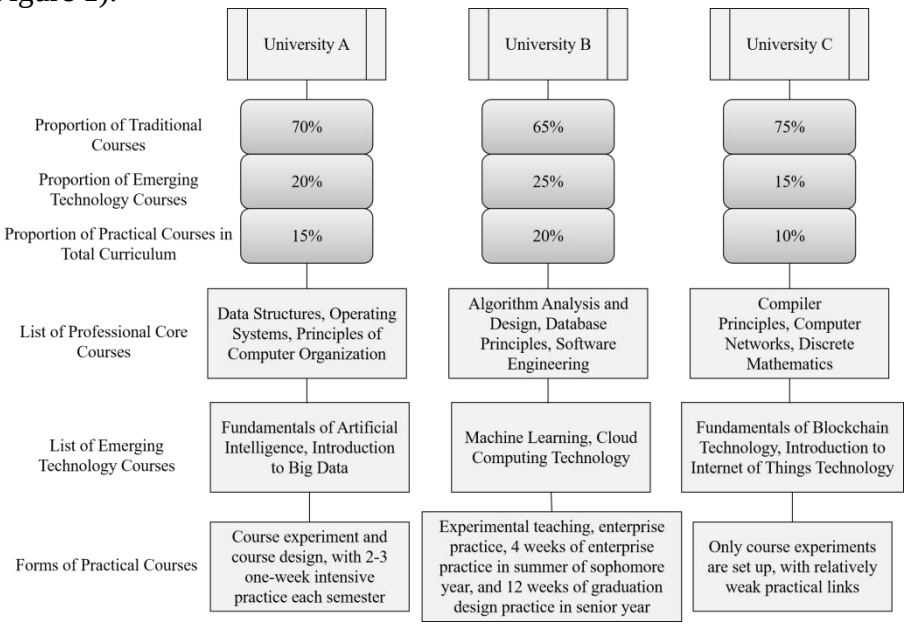

Figure 1 Course Setup for Computer Science Majors in Selected Universities

(2) The dilemma of practice platform

Practice platform is very important for the cultivation of high-end talents with scientific and technological innovation, but there are many difficulties at present. The number of practical posts provided by scientific research institutions and enterprises is limited, which is difficult to meet the practical needs of a large number of students and researchers. The resource allocation of practice platform is uneven. Some developed areas have advanced equipment and rich projects, while some underdeveloped areas have relatively simple practice platforms and low project levels. The cooperation between practice platform and universities and scientific research institutions is not deep enough, and there is no effective communication and coordination mechanism, which leads to the lack of close connection between practice and theoretical teaching, and it is difficult for students to make full use of their theoretical knowledge in practice, which affects the practical effect.

(3) The defects of incentive guarantee

The incentive and guarantee mechanism is not perfect, which affects the enthusiasm and stability of high-end talents with scientific and technological innovation to some extent. In terms of material incentives, the matching degree between salary and talent contribution is not accurate enough, and some high-end talents think that their salary fails to fully reflect the value of their scientific research achievements. The evaluation criteria of scientific research awards are sometimes not scientific and reasonable, paying too much attention to the number of papers published and the level of projects, ignoring the practical application value of scientific research results. In terms of spiritual motivation, although some units have measures such as commendation and reward, the form is relatively simple, lacking continuity and diversity, and it is difficult to effectively stimulate talents' sense of honor and accomplishment for a long time. In terms of security mechanism, living security measures such as housing and children's education have not been implemented in some areas, which has brought worries to talents and affected their dedication to scientific research and innovation.

5. Countermeasures and suggestions on the cultivation of high-end talents with scientific and technological innovation

In view of the problems existing in the current training of high-end talents with scientific and technological innovation, it is necessary to put forward targeted countermeasures from the aspects of education system, practice platform and incentive guarantee, so as to improve the quality of talent training.

(1) Improve the education and training system

Colleges and universities should increase the proportion of emerging technology courses, such as computer science, and increase the proportion of artificial intelligence and big data courses to 30%-40%. At the same time, innovative teaching methods, using case teaching, project-driven and other ways to stimulate students' independent learning and innovative thinking. It is necessary to strengthen the construction of teaching staff, encourage teachers to participate in enterprise practice and increase the proportion of "double-qualified" teachers (see Table 1).

Table 1: Optimization Objectives for Computer Science Major Courses

Course Category	Proportion Before Optimization	Proportion After Optimization	Optimization Measures	Expected Outcomes
Traditional Courses	65%-75%	50%-60%	Streamline and integrate traditional course content, remove outdated and repetitive parts, and strengthen the combination of basic theories with practical applications	Students can more efficiently master core basic knowledge, laying a solid foundation for learning emerging technologies
Emerging Technology Courses	15%-25%	30%-40%	Increase the variety of emerging technology courses, such as "Advanced Applications of Deep Learning" and "Fundamentals of Quantum Computing," and invite industry experts to participate in teaching	Enable students to keep up with the technological frontier and possess the ability to solve complex problems in emerging technologies
Practical Courses	10%-20%	25%-35%	Expand the forms of practical courses, increase participation in real enterprise projects and research topics, and establish an evaluation system for practical achievements	Significantly improve students' practical hands-on abilities and achieve effective transformation from theoretical knowledge to practical applications

(2) Build a high-quality practice platform

In order to solve the dilemma of practice platform, the government should increase investment and guide scientific research institutions and enterprises to increase the number of practice posts. Through policy support, we will promote the balanced distribution of practice platform resources, such as giving special construction funds to practice platforms in underdeveloped areas. The practice platform should strengthen in-depth cooperation with universities and scientific research institutions, and establish a regular communication and coordination mechanism to jointly formulate a scientific and reasonable practical teaching plan, so as to ensure the close combination of theoretical knowledge and practical application. At the same time, universities and enterprises are encouraged to jointly carry out scientific research projects, so that students can deeply participate in them and improve their practical ability.

(3) Improve the incentive and guarantee system

In terms of incentives, we should build a scientific and reasonable salary system and determine the salary according to the practical application value and market benefits of talents' scientific research achievements. The evaluation criteria for scientific research awards need to be further improved, taking into account multidimensional factors such as paper quality and project achievement transformation. The forms of spiritual encouragement should be further enriched. In addition to recognition and rewards, various forms of activities such as sharing experiences of outstanding talents and academic vacations can be carried out. In terms of security, the government cooperates with enterprises and universities to effectively solve the problems of talent housing and children's education, and create an environment for talents to study with peace of mind. By improving the incentive and guarantee system, we can fully mobilize the enthusiasm and creativity of high-end talents with scientific and technological innovation, and inject strong impetus into the development of scientific and technological innovation.

6. Conclusions

High-end talents with scientific and technological innovation are the core force to promote national scientific and technological progress and economic development, and the improvement of their training mechanism is very important. Through in-depth study of relevant theories, this article analyzes the existing training mechanism and existing problems, and puts forward targeted countermeasures and suggestions.

In the aspect of education and training system, optimizing curriculum, innovating teaching methods and strengthening the construction of teachers will help to cultivate students' innovative thinking and practical ability and make them better adapt to the needs of scientific and technological development. Building a high-quality practice platform, increasing practice posts, balancing resources and strengthening cooperation among all parties can effectively solve the problem of disconnection between practice and theory and enhance the practical innovation ability of talents. The improvement of the incentive guarantee system needs to be promoted from three aspects: establishing a scientific evaluation mechanism and reward system, constructing diversified forms of incentives, and improving comprehensive living guarantee measures, so as to effectively stimulate the enthusiasm and creativity of talents.

The cultivation of high-end talents with scientific and technological innovation is a long-term and complex systematic project, which requires not only the cooperation of educational institutions, scientific research units and enterprises, but also the active role of the government in policy formulation and resource allocation. Through the joint efforts of all parties, we hope to build a perfect talent cultivation ecology, win an advantage for China in global scientific and technological competition, and realize innovation-driven sustainable development.

References

[1] Zhang Chu, Zhang Zehao, Jia Guozhu. Research on the Promotion Mechanism of the Science and Technology Service Industry for the Advanced Manufacturing Industry Based on System Dynamics [J]. Science and Technology Management Research, 2023, 43(7): 77-85.

[2] Lou Jingjing, Zheng Pengfei, Feng Xiangrong. Construction of a Composite Talent Training System for the University-Enterprise Community [J]. Research in Higher Education of Engineering, 2022, 70(5): 106-110.

[3] Li Xin, Ma Wenya, Lin Fenfen. A Quantitative Study on China's Science and Technology Talent Policies Based on a Multi-dimensional Policy Analysis [J]. Forum on Science and Technology in China, 2023(10): 105-118.

[4] Sun Zhu, Xue Shulian, Qi Jiguo. Analysis and Enlightenment of the Talent Cultivation Model of Industry-University-Research Cooperation in Fintech in Domestic and Foreign Universities [J]. China University Teaching, 2022(12): 85-90.

[5] Wang Xue, Liu Zhiqiang. Practical Exploration of the Public Welfare Incubation Camp of Scientific and

Technological Writing in Assisting the Talent Cultivation in Universities [J]. Acta Editologica, 2022, 34(2): 226-230.
[6] Zhang Yao, Liang Guangchuan, Hu Ruohan, et al. Exploration and Practice of University Scientific and Technological Journals in Serving the Talent Cultivation of the Hosting Universities [J]. Acta Editologica, 2022, 34(6): 700-704.
[7] Wang Xinfeng, Zhong Binglin. Research on the Policy Coordination of Selecting and Cultivating Top-notch Innovative Talents [J]. Research in Education Tsinghua University, 2023, 44(1): 38-45.
[8] Wang Bo. The Reform Focus of Achieving the Independent Cultivation of High-level Talents in the New Era [J]. China Higher Education, 2024(21): 44-45.
[9] Liang Yan, Pu Zuhe. Exploration of the Cultivation Path of Applied Fintech Talents from the Perspective of Symbiosis Theory [J]. Theory and Practice of Education, 2023, 43(33): 12-15.
[10] Zhu Fen, Kong Yan. New Ideas for Cultivating Innovative Scientific and Technological Talents—From the Perspective of the Integration of Art and Science [J]. Science and Technology Management Research, 2021(5): 81-86.
[11] Liu Yang, Zhang Nong. Promoting the Construction of First-class Applied Universities in the Service of Chinese-style Modernization [J]. China Higher Education, 2023(22): 12-15.