

Study on the Cultivation of Graduate Students' Innovative Ability Integrating Discipline Competition and Scientific Research

Jiancheng Hu^{1*}

¹College of Applied Mathematics, Chengdu University of Information Technology, Chengdu 610225, China

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*Corresponding author: Jiancheng Hu

Abstract

Review Article

Analyzes the current status and existing problems of the cultivation of innovative ability of graduate students, and explores the cultivation mode that integrates discipline competitions and scientific research projects. And propose strategies for the cultivation of graduate students' innovative ability from the perspectives of innovative education concepts, collaborative innovation, practical teaching systems, and incentive mechanisms. Taking mathematical modeling competition as an example, this paper expounds the important role of discipline competition in the cultivation of graduate students' innovative ability, and emphasizes that the mode of integrating discipline competition and scientific research can stimulate graduate students' innovative consciousness and fully promote the cultivation of graduate students' innovative ability.

Keywords: Innovative ability; discipline competition; scientific research; collaborative innovation.

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1. INTRODUCTION

Innovation is the core driving force of national and regional development. The cultivation of innovative talents is in a leading position in the construction of national innovation capacity. Graduates are an important reserve of innovative talents, and graduate education is the main channel for cultivating high-level innovative talents in China's education system [1]. In 2020, the number of graduate students in China reached 2.9 million, becoming the second largest graduate education country in the world after the United States. Although the scale of graduate training is among the top in the world, there is still a gap in the cultivation of scientific research innovation ability compared with other countries. The main goal of graduate education in China is to cultivate teaching and scientific research talents who can independently engage in scientific research or teaching. The international competitive environment puts forward higher requirements for the cultivation of graduates, that is, to strengthen their own innovation and creative thinking [2].

The cultivation of graduate students' innovative ability is the core content of graduate education. The innovative ability refers to the ability to discover new problems, put forward new methods, establish new theories and invent new technologies. The final performance of innovation ability is to transform innovative thinking and innovative ideas into

comprehensive practical ability to solve practical problems [3, 4]. Therefore, it is particularly necessary to explore the status quo and influence mechanism of graduate students' innovative ability in colleges and universities.

2. STATEMENT OF THE PROBLEM

Nowadays, both developed countries and emerging economies in the world, facing the new economic situation and pattern, attach importance to graduate innovation education. And graduate education plays an important role in scientific and technological development and the cultivation of innovative talents[3,5]. Although the training conditions and teaching quality of graduates in general undergraduate colleges and universities in China have been significantly improved, and the ability of scientific research and innovation has also made great progress, there are still some common problems.

Many scholars have conducted in-depth research on the influencing factors of graduate students' innovation ability [6, 7]. By analyzing the current situation of graduate students' innovation ability, the results show that graduate students lack innovation spirit, innovation consciousness and innovation skills. At present, graduate education in colleges and universities is mainly limited to students' independent

innovation in the classroom situation, ignoring the social significance of innovation.

From the perspective of reality, graduate Students' scientific consciousness is not clear enough, and many graduate students have strong dependence on how to carry out scientific research. Under the long-term traditional examination oriented education system, graduates are often used to passively accepting knowledge, and their awareness of autonomous learning is relatively weak. Moreover, due to the lack of basic conditions for creating a strong scientific research and academic atmosphere in some colleges and universities, graduates' participation in scientific research is low, and the corresponding innovation achievements with high level are very rare

In addition, due to the lack of innovative training, students' innovation is not combined with practical applications and advanced technology, which will lead to an imbalance between the society's requirements for innovation spirit and innovative ability and student abilities. In view of the outstanding problems in college education, some measures can be taken to improve students' social innovation ability, and improve the internal mechanism and quality of students' scientific research and innovation. Therefore, how to cultivate the scientific research and innovation ability of graduate students has become the focus of extensive attention by education management departments, universities and education experts.

3. CULTIVATION MECHANISM of INNOVATION ABILITY

3.1 Change The Teaching Concept and Innovate The Talent Training Mode

The development of modern science and technology has shown a highly comprehensive trend of knowledge, which requires that the setting of graduate courses must pay attention to cross-cutting and interdisciplinary comprehensive courses. From the perspective of the cultivation of graduate students' research and innovation awareness and the training of research ability, not only systematic basic theories and professional knowledge are required as the basic support for research, but also the in-depth guidance of professional academic aspects [8, 9].

In order to enable graduate students to get good training of their innovative consciousness and innovative ability in the course of course learning, in addition to formulating a reasonable course system, it is also necessary to continuously reform the existing classroom teaching content and teaching methods. The latest frontier knowledge is the foundation of graduate students' innovation. Graduate courses need to lead graduate students to grasp the frontier hot issues and stimulate their innovative thinking. At the same time, reform the course teaching quality evaluation mechanism, highlighting the evaluation of multiple

evaluation, process evaluation and academic innovation ability.

Attach importance to imparting the most important knowledge in subject areas, presenting the most cutting-edge issues in scientific research, and strengthening students' grasp of knowledge and understanding of the knowledge production process through case teaching of cutting-edge research progress. Vigorously strengthen the study and training of methodology, and focus on cultivating graduate students' knowledge acquisition ability, academic discrimination ability and independent research ability

3.2 Enhancing The Collaborative Innovation Ability

As the mainstream mode of innovation development, collaborative innovation reflects the development trend of integration of various disciplines. Interdisciplinary and integrated research has become a new method and new idea of cooperative research. As an important part of the cultivation of innovative, graduate education integrates knowledge transfer, knowledge innovation and knowledge transformation. It is impossible for any training subject to master all the resources of graduate innovation cultivation. The cultivation of graduate innovation consciousness and the improvement of innovation ability need the joint efforts of multiple training subjects [10, 11].

The knowledge structure of talents needed by today's society should have the characteristics of complexity, hierarchy and variability. Interdisciplinary and integration has become the inevitable trend of the development of science and technology. For example, data science is an interdisciplinary subject, which is closely related to applied mathematics, computer, astrophysics and other disciplines. Moreover, at the practical application level, big data science covers a wide range of fields, including finance, transportation, mobile Internet and other industries.

In order to meet the needs of social development in the new era, exploring interdisciplinary talent training from the perspective of collaborative innovation in graduate training is not only in line with the objective law of the development of science itself and the needs of society for talents, but also an important way for colleges and universities to improve education quality, enhance competitiveness and maintain leading edge, It can effectively solve the disconnection between the current graduate education in Colleges and universities and the technical needs of the actual industry.

The cultivation of graduate students' ability from the perspective of collaborative innovation needs to update the new curriculum system and establish a diversified collaborative training mechanism; Break through the single inheritance and training of teachers and apprentices, and establish a team collaborative

training mechanism; Realize the collaborative training mechanism of interdisciplinary and interdisciplinary graduate students; Realize the industry collaborative training and build a graduate collaborative training mechanism integrating production, learning and research; Build an international scientific and technological cooperation platform and cultivate graduates' international vision and collaborative innovation ability.

3.3 Construct The Practice Teaching System

The innovative practical ability of graduate students is based on professional knowledge and professional skills, and the ability to use existing knowledge to creatively ask questions, analyze problems, and solve problems. Based on the innovation requirements of discipline competitions, promote and promote the improvement of graduate students' ability, in line with requirements for graduate ability training.

At present, graduate discipline competitions have become an important carrier for cultivating graduate students' innovative thinking and improving the overall quality of graduate students. It is also an effective means and measure to enhance graduate students' innovative practical capabilities, and has established a practical platform for graduate students' innovation and entrepreneurship education. Disciplinary competitions can effectively combine the scientific research capabilities of graduate students with practical problems, show their scientific research capabilities through entries, and demonstrate the level and level of scientific research through competitions, so as to stimulate graduate students' interest in innovation and entrepreneurship [12].

By organizing graduate students to participate in discipline competitions, the cultivation of their innovative ability can be integrated into the competition process. Relying on the cultivation of basic ability, in the process of participating in discipline competition, combining discipline competition with professional direction can stimulate graduate students' innovative thinking and exercise graduate students' innovative ability.

Since 2013, the Academic Degrees and Graduate Education Development Center of the Ministry of Education has launched the "China Graduate Innovative Practice Series" for graduate students nationwide. The event is conducted in the form of a series of theme events. According to the development trend of disciplines, majors or industries and the needs of the economy and society for talent training, nine independent themed events such as the China Graduate Electronic Design Contest and the National Graduate Mathematical Modeling Contest are set up. Taking the National Graduate Mathematical Modeling Competition as an example, relying on mathematical modeling, build a model for the

cultivation of innovation ability for science and engineering graduates. Build a practice training model for innovative research platforms for mathematical modeling and inter-professional cooperation research platforms for teachers. The improvement of innovation ability has played a great role in promoting. Mathematical modeling teaching and competition activities can connect the knowledge that students have learned with the surrounding real world. Through teaching and competition, students can cultivate their innovative consciousness, innovative thinking, innovative spirit and practical ability. Mathematical modeling itself also creates a whole practice process of self-study, independent thinking, and serious discussion for students, laying a good foundation for improving professional skills and scientific research capabilities, thereby enhancing graduate students' innovative ability.

3.4 Establish The Reasonable Incentive Mechanism

The value incentive for graduates is mainly reflected in the incentive measures to stimulate Graduates' academic interest, cultivate their free exploration spirit and independent innovation ability, and broaden their academic vision. Pay attention to the diversification of incentive methods, pay attention to the whole process management and supervision, and ensure fairness.

Graduate students gain a sense of self-worth and create a broader space for growth and development by taking on challenging tasks. It is necessary to change the traditional reward system (such as scholarships and scholarships) with single means and relatively fixed forms, establish a scientific research incentive mechanism that meets the inherent needs of graduate students to stimulate their innovation motivation, and focus more on the comprehensive evaluation of scientific research and innovation capabilities [14, 15]. During the implementation of the innovation incentive mechanism, the tutor shall provide continuous guidance and support to graduate students in scientific research and innovation, and encourage their graduate students to produce high-level, iconic scientific research results.

4. CONCLUSION

The cultivation of graduate students' innovative ability is an important part of the scientific research innovation system. Innovative ability and practical ability are the core content of graduate students' cultivation. In view of the new practical problems faced by many graduates, it is of practical significance to carry out the discussion and practice of the cultivation mode of Graduates' innovative ability integrating discipline competitions. The exploration and practice in recent years show that this cultivation mode has played an important role in cultivating graduates' basic scientific literacy and innovative ability. The cultivation of Graduates' innovative ability needs to be carried out from the school Starting from the level of

teachers and society, construct the curriculum system, thesis links and innovative activities; Build a multi-channel and multi-level academic exchange platform. Through carrying out academic exchange activities, create a strong academic atmosphere, stimulate graduate students' innovative thinking, improve graduate students' scientific research enthusiasm, promote graduate students' innovative ability, enhance their innovative consciousness and thinking.

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