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Research and Practice on Creative Talents Training Mode Based on Discipline Competitions

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Abstract: Talent is the foremost resource for promoting innovative development and a critical factor in establishing an innovative nation. Higher education institutions have the responsibility of nurturing creative talent and serve as significant pillars in implementing the country's strategy for innovation-driven development. Subject competitions act as a valuable extension of real-world learning. Students can refine their ability to practically utilize knowledge to resolve intricate functional difficulties, hone their skills in practical innovation and teamwork, and elevate their overall caliber through these competitions. This article proposes a model for cultivating creative and application-oriented talent by addressing issues relating to teaching concepts, techniques, and mechanisms in subject competitions. This model chiefly relies on curriculum structures, classroom political and cultural education, and "second classroom" activities to foster innovation-focused talents. By following this model, universities can not only stimulate research efforts on innovative and application-oriented talent cultivation but also effectively address concerns regarding teaching concepts, abilities, and mechanisms while fulfilling their historical mission and responsibility towards national and regional economic development in this new era. Additionally, the practice results driven by the subject competition in cultivating innovative talents offer useful insights and inspiration for other practice-based courses, demonstrating considerable potential for promotion and wider applicability.

Keywords: Creative Talent Training Mode, Discipline Competitions, Creativity and Entrepreneurship, Government, Industries, Academies, Research Institutions and Application

1. Introduction

Practical teaching is an effective way to consolidate and deepen theoretical knowledge. It is an important link for cultivating students' mastery of scientific methods and improving their practical skills, as well as a critical indicator for employers to evaluate the effectiveness of talent cultivation in schools [1, 2].

Research has shown that academic competitions are an effective means of identifying and nurturing gifted and talented students. In their study, Xiang found that participation in math Olympiads significantly improved students' mathematical reasoning, critical thinking, and problem-solving skills [3]. Similarly, a study by Belcheir suggests that science fairs can significantly increase students' interest in science, as well as their understanding and appreciation of scientific research [4].

Moreover, academic competitions can provide opportunities for networking, skill-building, and career development. Chen found that participation in programming contests was positively correlated with higher incomes and job satisfaction among computer professionals [5]. Another study by Hong shows that debating competitions help young people develop valuable skills in communication, public speaking, and critical thinking [6].

Cultivating creative talents is a long-term and complex project and an important orientation for the educational system reform [7]. Since the 18th National Congress of the Communist Party of China, General Secretary Xi Jinping has expounded for many times the core educational concept of

"what kind of people we should cultivate, how, and for whom", emphasizing the need to cultivate high-level creative talents with firm political beliefs and courage to make breakthroughs and to take risks.

Discipline competitions take specific projects in social practice as its research objects. The competitions test and also train students' ability to solve practical problems with their theoretical knowledge, help develop students' creative thinking, and help equip students with professional knowledge, scientific knowledge, humanistic qualities, and scientific research attitudes, as well as patriotism, creativity, dedication and better ethics. Undoubtedly, the platform provided by discipline competitions can not only significantly improve students' creativity in an all-round way, but also offers an effective approach for the research of creative talent training mode.

Colleges and universities should stand at a new historical height, take their responsibilities bravely and take part in deepening the educational reform. The institutions should also take good advantage of the competitive nature of discipline competitions and stimulate the enthusiasm of their teachers and students to participate. They may integrate students' development demands with competitions, encourage students to engage in competitions to apply what they have learned, so as to cultivate talents with creative thinking and abilities for the nation.

2. Bottlenecks in Cultivating Creative Talents

The traditional classroom teaching is still the main teaching method in universities, and both teaching and learning focus on knowledge, pursuing better academic effects by standing on the shoulders of giants. However, no innovation, no breakthrough [8]. Talents with creativity are the backbone of our national development. In recent years, discipline competitions in different fields and at different levels have accelerated the transformation of personnel training methods [9], but there are still bottlenecks that need to be solved urgently in terms of teaching concepts, abilities and mechanisms, which are as follows:

First, teaching concepts. Our guidance for students' just minds is not enough, and our teaching concepts changes slowly. Furthermore, there is a lack of a clear and long-term development vision, and a lack of systematic planning and execution plan [10]. The combination of "promoting learning and teaching by competitions" proposed by discipline competitions and our curriculum system is not satisfying, and the connection between theory and practice is not that close. All these cannot meet the requirements for developing students' creative thinking.

Second, teaching abilities. We should carry out innovative practice of combining theory with practice efficiently and achieve breakthroughs in practice, and all that lies in a profound knowledge and the ability to apply the knowledge [11]. College teachers trained by traditional education mode are limited in cultivating ingenious talents. The teachers inject insufficient "source power" in teaching, invest less than enough in innovative practice, and make inadequate "integration of competitions and teaching". Additionally, their ability of political teaching in classes needs to be improved, and it is common for them to emphasize teaching methods, results and theories, while neglecting learning methods, processes and practice.

Third, teaching mechanisms. There is no perfect education mechanism conducive to cultivating creative talents either in teaching and learning or management. And there are many problems: monotonous training model; imperfect evaluation system; few platforms for innovative practice; incomplete professional practice system; incomplete construction of incubators and maker space for college students' entrepreneurship; insufficient promotion efforts for the new mechanism of integrated social resources, campus cultivation, and student-led practice; inability to serve local economy; and inadequate integration of "government, industries, academies, research institutions and application" in improving students' creativity.

3. Exploration on Measures to Cultivate Creative Talents

Based on the characteristics of innovative talents and the advantages of discipline competitions in fostering innovative talents, talent training measures can be explored from the following 14 aspects.

1) Strengthen Moral Education Through Conducting Political Education

Only independent innovation can promote our international competitiveness unceasingly. And those creative talents who dedicate themselves to the cause of the country are the backbone of the country and the hope of the nation. We should make the political courses our basis, and continue to explore the elements of political courses from discipline competitions. Eventually, with all these efforts we may succeed in developing students' ideals, beliefs, and consciousness of enterprise and responsibility. We should also carry out the "Excellence Creation Action" through political courses in three dimensions to promote classroom political education. And through discipline competitions, we can foster students' scientific research attitudes for seeking truth and new knowledge, daring to be the pioneer and never giving up, and also encourage teachers to cultivate geniuses who can make creative contributions to our social development.

2) Inspire Creativity and its Education Through Competitions

Discipline competitions are practical activities centering on exploring knowledge in professional fields, which attaches great importance to the development of students' ability to comprehensively use the knowledge of multiple professional courses and creatively solve practical problems. The education for students' abilities should change from learning ability-orientation to creativity-orientation. We should also

make effective use of the "four links" training channels-"innovation and entrepreneurship projects", publication of innovative academic papers, application for patents or copyrights for research results, and study for a "higher-level degree". We should encourage students to choose their own research groups and participate in the projects of their academic supervisors and even national and provincial projects. Through "project research group" or "presiding over the national and provincial projects", students may develop their interests in scientific research, and we may drive their desire for in-depth and active study with their interests, so as to develop their creativity and pioneering attitudes, and meet their individualized development demands.

3) Build the Curriculum a more Inclusive System

The teaching mode should make changes from theoretical teaching to a combination of theory and practice. The model applies the products of discipline competitions into teaching, stressing "teachers' achievements into teaching materials, classrooms and graduation theses"; Relying on the existing teaching software and hardware conditions, the model integrates "educating by discipline competitions" and "educating by curriculum" that based on competition instruction. According to the problems encountered in the competitions, the knowledge structure of the curriculum is improved, the development of first-class courses and first-class teaching materials is advanced, and a four-wheel drive cultivation system will finally build on the basis of general education, which would promote professional education through discipline competitions and education for innovation and entrepreneurship.

4) Promote Both Students' General and Professional Knowledge Through Cultural Education

Culture is fundamental for a nation's development, and the essence of our national culture should be an integral quality for our creative geniuses. At the same time, a rich knowledge is also important for students to develop their open thinking and to find their own way of innovation in creative researches. Therefore, they need to study their professional knowledge in depth, refer to western culture and the knowledge of the horizontal subjects, and realize the status and the development trend of their majors [12]. We should do a good job in discipline competition publicity in the whole process and all directions with libraries, school history museums, archives, league history museums, cultural and artistic (educational) centers, etc. We should create a favorable environment for innovative research by holding annual activities such as "Culture Festival" and "Power of Model", so as to encourage students to learn and broaden their horizons, which can lay a good cultural foundation for their creative thinking and practice.

5) Promote the Competitions Through the "Second Classroom"

Creative talents usually show characteristics such as energy, flexibility, openness, curiosity and exuberant thirst for knowledge in learning. We should take advantage of the resources in the "second classroom" coupled with the first classroom to improve the extracurricular practice system; make effective use of the Implementation Measures of Innovative Credit System, and encourage students to gain credits through multiple innovation and entrepreneurship practice such as discipline competitions and patent applications; and merge teaching and competitions to stimulate students' interests in in-depth exploration of their professional knowledge, and develop their innovative potential for scientific research involving imagination, attention, and perseverance. In conclusion, the second classroom is an ingenious way to boost our cultivation for creative talents in universities.

6) Enhance the Strength of the Teaching Faculty Through Talent Training

Teaching management should transform from extensive management to scientific and comprehensive management, implementing a three-tiered supervision for teaching [13]. A strong faculty is a prerequisite for innovative talent cultivation, and teacher training should be carried out on three levels: in terms of teachers, newly-hired teachers should receive competency training, backbone teachers should receive core competitiveness training, and top-notch teachers should receive personalized development training to enhance their skills and abilities. In terms of subject competitions, a training tailored to math and physics competition coaches should be developed systematically, enhancing their professional competence and capability to instruct the competitions. In the process of faculty development, emphasis should be placed on integrating competition achievements into textbooks, classroom teaching, and thesis guidance. Special attention should be given to teaching, using competition results and knowledge to enhance teaching competence and cultivate a faculty with high teaching levels, strong practical guidance abilities, and remarkable competition coaching achievements.

7) Promote Teachers' Enthusiasm and Dedication Through Effective Incentive Mechanisms

We will improve the incentive mechanisms at both the school and department levels to enhance the initiative, enthusiasm, and competitiveness of teachers and students in discipline competitions. Our focus is on training a team of teachers who possess deep professional knowledge, extensive guidance experience, and attitudes of dedication and teamwork. We will thoroughly implement the essence of the General Plan for Deepening the Reform of Educational Evaluation in the New Era, combining teacher evaluation mechanisms with job title evaluation and end-of-year performance evaluation to tap into teachers' potential. We will strengthen teaching quality by refining teaching methods and concepts, and integrate advanced educational concepts into classroom teaching, academic research, and talent cultivation centered on discipline competitions. This will fundamentally enhance our ability to cultivate innovative talent.

8) Promote Students' Development and Education Through Competitions

The survival of the fittest - competition is the driving force of development. A competitive mechanism will be introduced through participation in subject competitions [14]. During the

tense discipline competitions, students, the main participants, are motivated to learn fundamental knowledge and integrate theoretical knowledge to solve practical problems in a challenging and cohesive competition. Incorporating teacher evaluation and student reward systems into discipline competitions, such as giving more weight to mathematics and physics competitions in teacher evaluations for STEM courses, can effectively stimulate the initiative of both teachers and students, encourage teachers to integrate competition content into teaching, promote the symbiosis of classroom learning and practical application, and enhance the self-innovation ability of university students.

9) Perfect the System for Student Development Through Teaching Evaluation

Establishing a well-rounded education system is the foundation for cultivating innovative talents, and a rigorous and practical work style is essential for university teachers. The growth of innovative talents requires a scientific, open, and inclusive academic environment. Through teaching evaluations and the strengthening of teachers' professional ethics, we will greatly demonstrate teachers' unwavering innovative attitude toward goals and study which can inspire students to go ahead. We should also establish a multi-level and diversified quality evaluation system for teaching quality, based on a three-level linkage among the university, colleges, and course groups, to ensure the quality of teaching and monitor the teaching teams through various levels and forms. We aim to achieve "no discount in teaching requirements and no decline in teaching quality", and ensure the effectiveness of "holistic education" from an institutional perspective.

10)Improve Innovation Capabilities Through Collaborative Platforms for Different Disciplines

To enhance students' innovation ability, it is necessary to comprehensively develop their solid disciplinary knowledge, interdisciplinary related knowledge, practical operation skills, problem-solving strategies, and innovative attitude of daring to think and do, so that they can have the ability to creatively design technical solutions, apply their learned knowledge comprehensively, and solve problems. we should establish a professional construction guidance committee jointly built by professional associations, well-known enterprises, and university experts to deepen cooperation with enterprises in various aspects, such as improving curriculum design, strengthening teaching process management, and meeting social needs. The committee also aims to combine the demands of enterprises with the construction of majors, the development of new courses, and the transformation of teaching methods, to enhance collaboration between academia and industry. By combining the problems encountered by enterprises in the production process with subject competition training, continuous efforts are made to strengthen students' independent innovation ability. "Encouraging learning through competition and integrating teaching with competition" is applied to optimize and adjust the direction of classroom teaching and teacher development, and to strengthen the cultivation of innovation ability.

11)Enhance Students' Practical Skills Through University-Industry Partnerships

Science is rigorous, and academic innovation must start from reality and follow the objective laws of the development of things [15]. The talent training mechanism is shifting from a unilateral approach to a complementary practice teaching and win-win mechanism between universities and enterprises. It establishes school-enterprise cooperative classes with enterprises, builds a communication bridge between general education in universities and vocational practical education, and allows students to work on enterprise projects, forming papers and patents through innovative practices. It takes various subject competitions as breakthrough points and promote the transition from the "competition arena" to the "marketplace". Through school-enterprise cooperation, internship and training bases are established in enterprises, exploring the education model of industry-education integration through on-the-job and follow-up internships, and carrying out school-enterprise collaborative education. By utilizing the advantages of enterprise resources, students can apply what they have learned in the actual work environment, enhance their abilities, and promote the implementation of "learning from competitions and teaching integrated with competitions."

12)Hone Innovation and Entrepreneurship Skills Through Scientific Disciplines Practice Platforms

Our self-reliance and self-improvement in science and technology must first be based on basic theoretical research and original innovation. The cultivation of innovation ability should focus on cultivating students' innovation confidence, encouraging them to question and challenge scientific and technological problems, supporting their freedom of exploration, and cultivating a good scientific research ecosystem. Efforts should be made to increase students' investment in basic subjects such as mathematics, physics, and chemistry. While encouraging students to participate in mathematical modeling, mathematical, physical and other competitions, we will rely on national major scientific research projects to attract students to participate actively in scientific research. And we will improve teaching system with scientific research, and temper and enhance students' ability to solve practical problems in the scientific research, thereby enhancing students' innovation ability.

13)Create an Environment for Technological Innovation Through Advanced Experimental Teaching Platforms

Science and technology innovation cannot do without scientific experiments. Innovation is about discovery, and every technological innovation is accompanied by breakthroughs and discoveries in theory or technology. The experimental teaching of various disciplines in universities should guide and cultivate students' sensitivity to observe things and their persistent attitudes of getting to the bottom of the matter and develop their abilities to discover, connect, and break through. By rigorously practicing scientific innovation, students' innovative abilities can be enhanced. Utilizing national and provincial virtual simulation experiment projects, we can combine practice with experimental courses, continuously optimizing professional training programs, improving the experimental teaching outline. We will also

integrate coaching and training for discipline competitions, continuously improving the construction of experimental platforms, and fully enhancing students' innovative abilities.

14)Serve Regional Economic Development Through Collaboration Between Government and Academies

To increase the effort in cultivating innovative talents independently, universities should set up courses scientifically, promote basic research and interdisciplinary integration, and effectively utilize the role of academic competitions. In addition, the integration of technology and social development demands should be promoted to facilitate the close connection between the government, industries, academies, research institutions and application. Research projects should be designed according to local economic development needs, identifying themes that can be related to academic competitions to inspire innovative talent cultivation. Competitions can be used to achieve research results that solve practical problems. We will sign cooperative agreements with the local government and other schools, encourage enterprises to increase innovation investment, and promote the deep integration of government, industries, academies, research institutions and application, enhancing our sense of responsibility in cultivating innovative talent in universities. the direction and intensity of student training can be optimized and improved according to local development needs. With innovation-driven development as the driving force of talent cultivation, the collaboration between industries, academies, and research institutions can be deepened to cultivate and train innovative talents through practical activities, serving regional and even national economic development.

4. Conclusion

Talent competition has become an important aspect of international competition, and a sustained supply of high-quality innovative talents are needed to support national development. For talent cultivation, universities should consolidate its foundation and make precise efforts, striving to achieve their talent development goals in practice. What's more, universities should also focus on combining school disciplinary characteristics with social needs and strengthening laboratory and internship training base construction through cooperation with government and enterprises. Key areas for advancement include implementing the fundamental task of moral education, further enhancing the construction of course ideology and the "Three-All" education under the new concept of this achievement, deepening the integration of science, education, industry, and research, improving the cooperative education system of government, industries, academies, research institutions and application and cultivating talents for the party and the country. We should improve the level of professional development. Guided by the major national engineering strategy, based on existing key laboratories, research centers, and innovation teams, we should continue to optimize resource allocation, actively guide various professional directions, and give clear positioning and strengthen our unique features to assist in the construction of "New Engineering." The "three-in-one" of textbooks, teaching, and teachers should be adhered to promoting textbook construction, deepening teaching reform, and enhancing teacher capabilities. We should build a highly qualified and innovative faculty team capable of conducting course ideology construction, providing strong guidance for academic competitions, and developing entrepreneurship and innovation abilities among college students. We should enhance our ability to provide comprehensive talent cultivation services to meet the needs of local economic development and to continuously supply talents to the national scientific research team.

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