

Research and Practice of College Students' Innovative Ability Training Mode Based on "Four in One"

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Abstract: Under the development trend of "mass entrepreneurship and innovation", the cultivation of college students' innovation ability is particularly important. In the face of the requirements of current social and economic development and the adjustment of industrial structure, colleges and universities play an important role in the cultivation of college students' innovation ability. Focusing on the requirements of talent training, we construct the four-in-one (classroom teaching, scientific research training, science and technology competition, and school-enterprise cooperation) classroom teaching to simultaneously take the multi-pronged and multi-measures to cultivate college students with innovative consciousness, innovative ability and innovative value.

Keywords: Four-in-one; Innovate; College student

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With the development of economy and society, carrying out "mass entrepreneurship and innovation" has become the trend of The Times, which has also risen to the height of national development strategy. College students are the main force of social innovation and entrepreneurship in the future. College students is the main force of social innovation and entrepreneurship in the future. Strengthening the innovation and entrepreneurship education for them, cultivating their innovation awareness, stimulating their entrepreneurial potential, and improving their innovation and entrepreneurship ability are of great practical significance for them to adapt to increasingly fierce social competition, improve their comprehensive quality, better realize their value of life, and promote the sustainable development of national economy^[1]. It is of great strategic significance to improve the effectiveness of college students' innovation ability training, to train and enhance their innovation ability, to improve the quality of college talents training, to enrich the theoretical significance of higher education and the content of higher education reform, and to promote the development of higher education. At present, the four-in-one (classroom teaching, scientific research training, science and technology competition, school-enterprise cooperation) model has played a positive and effective role in the cultivation of students' innovative ability.

1. "Four in One" Training Mode

1.1 Organic combination of scientific research content and classroom teaching

Teachers should not only impart textbook knowledge in the classroom, but also teach college students the basic methods of scientific research and innovation. They should introduce the latest professional technologies and research achievements related to the curriculum into teaching, subtly broaden students' vision and stimulate students' enthusiasm for learning. Studying professional frontier technology can effectively promote the development of students' scientific research activities and give full play to their own potential, which is a good foundation for the development of college students' scientific research practice. In the teaching process of the major, teachers should fully implement the principle of attaching equal importance to theory and practice. While strengthening basic theory learning, teachers should further emphasize the role of scientific research training and highlight the cultivation of students' innovative thinking and ability^[2].

1.2 Open Research laboratory

The research laboratory is fully open to students in their spare time. Students can independently choose experimental projects they are interested in, design experimental procedures, and book experimental time. At the same time, students are encouraged to participate in scientific research projects that teachers are researching, and conduct basic research projects. The opening of the scientific research laboratory undoubtedly provides the most suitable platform for the improvement of the innovative ability of college students, and creates an atmosphere of exploration and research for students. It can not only fully mobilize the enthusiasm and initiative of students, give full play to their own potential, but also improve their hands-on ability and comprehensive innovation quality.

1.3 Actively participate in science and technology competitions

Teachers can propose the direction of scientific research innovation topics. The participating students can study specific and feasible experimental schemes and processes. And the instructor can recommend the review of college students' scientific and technological innovation training projects. During the period, the instructor can provide assistance throughout the whole process, hold regular discussions with students, give necessary guidance in key links, and guide students to exert their subjective initiative in innovative experimental training. At the same time, students should regularly report the results of the experiment to the instructor, and finally, under the guidance of the instructor, complete the writing of the thesis and the final report. In the process of completing the science and technology competition, teachers should focus on cultivating students' objectivity and diversity of academic thinking, encourage divergent thinking, and emphasize the originality of scientific research innovation.

1.4 Continuously strengthen cooperation between schools and enterprises

We should take the sharing of campus resources as an opportunity to integrate internal resources, find the interest points of school-enterprise cooperation, broaden financing channels to attract high-level enterprises to help establish training centers, realize the close combination of professional, industry and enterprise, and form a "school-enterprise integration" development model. Personnel training and industrial development docking seminars should be held regularly or irregularly to give full play to the role of enterprise practical talents in the personnel training program formulation, curriculum construction, teaching content and method reform and achieve seamless connection between personnel training and industrial development and the actual needs of the employing department.

2. Ways to Cultivate College Students' Innovative Ability

2.1 Combining with the advantages of disciplines, the research platform is used to cultivate the innovative ability of college students

In the classroom, teachers introduce the latest professional technology and scientific research results related to the curriculum into the teaching, subtly broaden students' vision and stimulate students' enthusiasm for learning. Studying professional frontier technology can effectively promote the development of students' scientific research activities and give full play to their own potential, which is a good foundation for the development of college students' scientific research practice. Teachers should fully implement the principle of attaching equal importance to theory and practice, while strengthening basic theory learning, further emphasize the role of scientific research training, and highlight the cultivation of students' innovative thinking and ability.

In practice, students themselves will find a lot of problems, at this time, teachers consciously guide students to carry out relevant experiments, so as to achieve the sublimation of theory-practice-theory. Scientific research improves students' subjectivity. Subjectivity means that students can exert their learning potential to form effective learning strategies, and improve their independent learning ability through active learning methods such as observation, experience, and inquiry. Freedom is the mother of creation, and the spirit of independent thinking and questioning is the soul of education. Scientific research just gives students the space to create freely and think independently.

2.2 Carry out "promoting learning through competitions" and improve the construction of competition platforms

Students are actively encouraged to participate in all kinds of skills competitions at all levels, which will help form an incentive mechanism and form a technical talent training atmosphere for students to strive for technology and become technical experts. Promoting learning through competition can not only improve students' practical ability and application ability, but also enable them to get honors and recognition. Moreover, students can understand the gap, generate strong learning motivation, and enable students to learn, grow and innovate in the competition^[3].

Science and technology competitions emphasize the use of innovation in competition and that new methods, new ideas or new technologies are adopted in the work. All these require college students to pay attention to the cultivation of innovative consciousness

in the preparation stage of science and technology competition, and train innovative thinking in order to carry out innovation in the process of competition. Science and technology competition is different from the learning or learning competition of general courses. Its main performance evaluation is the program, scheme or product related to the proposition, which requires college students to have strong practical ability. In addition, the questions of science and technology competitions are usually systematic, which requires the participating college students to comprehensively use the knowledge of multiple related courses. So, participating college students need not only have a solid knowledge foundation, but also have a good independent learning ability.

2.3 Cultivate college students' innovation ability by relying on school-enterprise cooperation platform

School-enterprise cooperation can provide more practical internship opportunities for college students, so that students have a more direct and deeper understanding of the actual production, operation and management of enterprises. The school can use professional talents and technical advantages to carry out industry business training and enterprise staff business training. Enterprises can appoint senior executives, technical research personnel as mentors or part-time teachers to guide or train students. In this way, the purpose of complementary advantages and sharing human resources can be realized.

Schools should work with enterprises to plan the construction of practical training sites and develop projects, so as to achieve a long-term operation mechanism of off-campus training bases that relies on enterprises, school-enterprise cooperation, industry-university combination, complementary advantages, resource sharing, and interaction and win-win. We should build the campus training base and stable off-campus training base with advanced technology and in line with actual production needs. And the off-campus training base should meet the requirements of students' practice, teachers' scientific research and technical services.

3. Conclusion

The establishment of the innovative research platform based on the four-in-one (classroom teaching, scientific research training, science and technology competition, school-enterprise cooperation) model has played a complementary role in the cultivation of students' innovative ability.

3.1 The research platform promotes college students' innovative practice

Through the construction of scientific research platform, the ability of independent thinking of college students is cultivated and the innovative practice of students is greatly promoted.

3.2 The scientific research activities improve teaching quality

Practice has shown that the construction of innovative scientific research platform organically combines classroom teaching with scientific research training and science and technology competition. Scientific research interacts with teaching, teaching activities are driven by scientific research activities to introduce the latest scientific research progress into teaching content, which can greatly improve teaching quality.

3.3 The competition stimulates the innovation potential of college students

The construction of the system of promoting learning and research through competition encourages students to design independently or actively participate in teachers' scientific research projects. The integration of science and technology competition and teaching is not only an effective way to consolidate teaching content, but also the expansion and extension of teaching content, which plays an important role in stimulating students' scientific research potential and improving teaching quality.

3.4 The university-enterprise cooperation improves college students' innovation ability

We should create a three-dimensional innovation and entrepreneurship curriculum system that runs through school-enterprise resources. Through school-enterprise cooperation and resource penetration, the real production service process of the enterprise is connected with the curriculum knowledge system, the actual operation problems of the enterprise are broken down into specific projects completed by college students, and the innovation consciousness and problem-solving ability of college students are trained.

References:

- [1] Xiaoxia Jian, Hebao Wu, Renlong Xiong, et al. Practice and Reform of Cultivating Innovative Ability of College Students[J]. Educational Informatization Forum, 2022(11):84-86.
- [2] Shuhui Zhu, Guorong Sui, Qi Wang. Research on the Innovation Ability Improvement System of College Students from the Perspective of New Engineering[J]. China Adult Education, 2022(08):45-48.
- [3] Yan Liang, Weixun Li. Construction and Practice of the "Three in One" Cultivation Model of College Students' Innovative Ability Based on Mathematical Modeling Series Competitions[J]. Journal of Lanzhou Petrochemical University of Vocational Technology, 2023, 23(02):50-53.