

The Exploration of College Students' Innovative Training Plan to Cultivate College Students

Peichang Yu^{1*}, Qiang Chen¹

¹*College of Intelligence Science and Technology, National University of Defense Technology, Changsha 410073, China*
^{*}*Corresponding author. Email: yupeichang@gfkd.edu.cn*

ABSTRACT

As an important method for undergraduates' ability training, the 'University Students Innovation and Entrepreneurship Training Program' has become an important platform for college students to improve their innovative abilities, promote the reform of college training methods, and expand students' horizons and thinking. This article takes the project 'on-board magnetic levitation dynamic inspection intelligent system' as an example, and analyzes the project's program formulation, training process design, and training system design process in the development of college students' ability, combined with the existence of the project in the progress. The deficiencies and problems of the college students' innovative training program have been preliminarily discussed in the ability of college students. Provide reference for further improving the quality of college students training.

Keywords: *College Education, Innovative Training Plan*

1. INTRODUCTION

In recent years, with the rapid development of social economy, higher education has also entered the fast lane. After years of substantial growth in the number of college students, a large number of talents have been guaranteed for my country's economic construction. However, there are also many problems in the education process of college students. First of all, under the influence of objective factors, the ability of college students is lacking. In recent years, with the expansion of college enrollment, the contradiction between the shortage of teaching resources and the increase in the number of students has become prominent, and the contradiction between the limitation of teaching conditions and the ability of college students is prominent, which objectively causes the lack of ability of college students[1][2]. Secondly, students have insufficient understanding of the training goals and meanings of abilities, and they have negative emotions. All these have resulted in a subjective decline in the quality of training. Third, the number of students led by the instructor is large, the conditions are insufficient, and the educational resources are scattered, which reduces the interest of students and the quality of guidance, and the quality of training is naturally difficult to guarantee.

In response to the above situation, in order to improve the quality of college students' training and improve their innovative ability. China has implemented a national-level college student innovation and entrepreneurship training program to promote colleges and universities to change their educational ideology, reform talent training models, strengthen innovation and entrepreneurship training, enhance college student' innovative abilities and entrepreneurial capabilities based on innovation, and

cultivate adaptable innovation High-level innovative talents needed for national construction. During the "Twelfth Five-Year Plan" period, the Ministry of Education began to implement a national-level college student innovation and entrepreneurship training program. Our school is a typical engineering college, mainly for innovative training projects. Individuals or teams of undergraduates, under the guidance of their supervisors, independently complete innovative research project design, research condition preparation and project implementation, research report writing, and achievement (academic) exchanges. Scholars have conducted a lot of research and discussion on how to carry out College Innovation projects. Some scholars[3] believe that through the implementation of the project, not only the innovative thinking and level of innovation of college students can be cultivated in all aspects, but also the needs of market economic development can be met. If relevant research can be conducted on the basis of combining the research topics of the instructor, it will have strong operability and significance. Some scholars[4][5] also discussed how to further improve students' innovative ability through the formulation of systems and the design of programs. All this provides a good support for us to better carry out the "college student innovation and entrepreneurship training program".

This article takes the application, scheme design, and execution of the "carrying magnetic levitation dynamic inspection intelligent system" project carried out by the author under the guidance of the author as an example to conduct a preliminary discussion on the ability of college students. Provide reference for further improving the quality of college students training.

2. TOPIC SELECTION DESIGN

The choice of the subject is the primary issue. The feasibility of the implementation of the subject, the practicality of the subject's goal-oriented and the difficulty of the subject are all issues that must be considered. The topic selected for this topic, "Mounted Magnetic Levitation Dynamic Inspection Intelligent System", obtained the qualification for the project of the Hunan Province 2020 College Student Innovation and Entrepreneurship Training Program. This topic is based on comprehensive consideration of the current mid-to-low-speed maglev rail transit market's eager demand for this technology, combined with the author's research on scientific research topics, and using existing test conditions to carry out this work. In the topic selection process, as shown in Figure 1 below, a balance between the practical value of topic selection, the difficulty of the topic, and the basic conditions of the topic should be achieved.

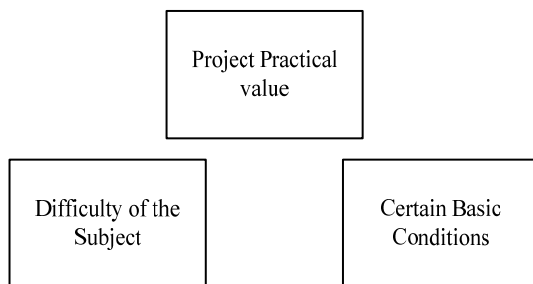


Figure 1 Three requirements for topic selection

Among them, the practical engineering value of the subject is the core, the reasonable degree of difficulty is the guarantee of the sustainability of the subject, and a certain condition basis is the basis for the execution of the subject.

2.1. Engineering practical value is the first requirement for topic selection

The values of engineering sciences that apply what they have learned need to be passed on through the process of engineering practice through topics with practical value. As an engineering college student, the cultivation of engineering practical ability and the cultivation of technological innovation thinking are our training goals. Therefore, we must come from the project, go to the project, and avoid the cultivation method from books to books. Therefore, in selecting the topic, we should first consider whether the topic has engineering practical value. Only when the project has practical engineering value can it attract students' participation. In the process of engineering practice, while cultivating students' learning ability and motivation ability, it can significantly improve students' sense of accomplishment and gain through the generation of applied value.

Through the determination of the practical value of engineering, it is possible to select topics with vitality, support value, and student learning value as the basis for the cultivation of college students' innovative ability.

2.2. Reasonable difficulty is the guarantee for the sustainability of the subject

On the one hand, in the process of topic selection, we must fully consider the students' existing knowledge base, learning ability and subsequent development, and choose difficult, easy and reasonable topics for innovative training. It should be noted that with the development of society, young college students are relatively fragile in their psychology. They should pay attention to their psychological changes in innovative research on topics and in the learning process. In the training process, we should guide from easy to difficult topics. On the other hand, the duration of the topic is relatively long, usually 1-2 years. In this process, students continue to learn and grow. Therefore, in the setting of the topic, the topic can be subdivided into multiple sub-topics, combining the knowledge learned by students, from basic to upper level, from simple to complex. Combining the research of the subject with the growth of the students, the whole process of the subject can be set from easy to difficult.

The subject of reasonable difficulty is based on a rational understanding of the characteristics of student training and a scientific understanding of education. Regarding the design of the difficulty of this subject, the trainees are required to pass this innovative project to achieve a comprehensive inspection of the current low- and medium-speed maglev line. Develop a set of hardware and software systems. Moreover, the hardware design is placed on the front end, and the hardware design is divided into multiple modules such as mechanical mechanism design, sensor system design, signal acquisition design, signal processing design, and intelligent detection and perception algorithm design. The design process of these modules is carried out

in conjunction with the professional learning content of undergraduates. With the deepening of their professional knowledge learning, the difficulty of subject research is continuously increased, which can not only ensure that they can achieve the subject goals, but also ensure that they can learn new knowledge content in advance and improve the quality of training.

2.3. A certain conditional basis is the basis for the execution of the subject

The selection of topics should be based on derivative topics that the instructor has a good research foundation. First of all, the time and energy of the instructor is limited. If a brand-new topic is adopted, the time and energy input of the instructor is difficult to guarantee. Choosing familiar fields and familiar topics can better provide students with comprehensive and in-depth guidance. Secondly, having a certain experimental condition basis is also an important condition for subject selection. The support funds for this project are limited. From the perspective of the characteristics of engineering, a large amount of hardware environment is required, and related equipment and components are required. If all support funds are used, it is unsustainable. Therefore, selecting topics related to the research content of the research group and the teaching and research section and using the existing equipment and experimental environment can not only greatly reduce the cost of training, but also ensure the quality of student training.

Taking the choice of this subject as an example, this teaching and research section has been conducting research on maglev transportation for a long time. It has a solid foundation in this field and has a 204m long maglev rail transit line that can be used at any time. At the same time, there is a medium-speed maglev train that will roll off the assembly line in 2018. All these provide better support for the subject.

As shown in Figure 2, this is the medium-speed maglev train and its tracks used in our school's test. The track structure and car body structure are completely consistent with the operating environment. This provides extremely favorable conditions for our debugging



Figure 2 Maglev system for experiments

Therefore, through the selection of this type of topic, it can support the research of the topic in all directions and provide powerful conditions for the cultivation of college students.

3. DISCUSSION ON THE STUDENTS' COMPREHENSIVE ABILITY

As an important undergraduate teaching reform project, college innovation project is not only conducive to the prosperity and development of society, but also conducive to the cultivation of talents in universities and the employment of students. From the practical process of this topic, the cultivation of college students' ability can be summarized as the following aspects:

First of all, College Innovation projects can stimulate students' sense of innovation. College students are limited by their life experience, have strong vitality and broad thinking, but lack a clear understanding of how to realize their ideas and how to carry out innovative activities. Subconsciously failing to set innovation as something within its power. However, through the application and implementation of the project, under the guidance of the instructor, students actively think about and comprehensively consider their professional background and hobbies, each choose their own research objects, and give full play to their own characteristics. This has cultivated college students' sense of innovation and autonomy. In the process of the project, on the one hand, it provides students with a platform for applying theory to practice, personally participating in and implementing innovative and entrepreneurial activities, so that they can cultivate to face difficulties and actively solve difficulties in the process of carrying out and implementing projects. Innovative spirit. On the other hand, College Innovation projects also create opportunities for college students to innovate and start businesses, so that students in school can get in touch with engineering projects and have engineering practice experience before they enter society. Secondly, the project cultivated students' teamwork ability. During the implementation of the project, the topic was divided into multiple small tasks, which were assigned and discussed by the students. The students took into account their personality characteristics and different professional background characteristics, and coordinated to choose a suitable field for research. At present, the project team has 5 members, and they cooperate with each other to greatly improve their coordination ability and project execution ability.

Thirdly, the project has cultivated students' hard-working spirit. Unforeseen hardware problems are often encountered during the execution of the project, which requires persistent analysis and research. In the implementation of the project, the students dare to face and take responsibility, overcome the difficulties encountered one by one, enhance the students' self-confidence, and cultivate the spirit of daring to endure hardships.

4. CONCLUSION

Through the implementation of the project and under the guidance of the instructor, students have independently completed the topic selection, project research, project design, report writing, internal work coordination and other work, actively participating in the research and discussion of the project. Among them, they gave full play to their subjective initiative. Through engineering practice, trainees' engineering ability, team writing ability, and mutual

ACKNOWLEDGMENT

This work was supported by the National Key Research and Development Program of China under Grant 2016YFB1200601.

REFERENCES

- [1] Cui Hongyun, Song Yuanhang, Tian Guozhong. Undergraduate Innovation Project: Cultivation of Students' Innovative Thinking and Ability[J]. Journal of Suihua University. 2017(5). pp.40-41. DOI: 10.3969/j.issn.2095-0438.2017.05.034
- [2] He Bing Gao. Research on the Optimization Mode of School-Enterprise Cooperation Based on the College Innovation Project[J]. The Science Education Collects. 2018(5). pp1-2. DOI: 10.16871/J.cnki.kjwha.2018.09.001
- [3] Song Lei, Ye Haonan. Research on the Cultivation of Innovation Ability of College Students[J]. Education space. 2020,pp.151-152.
- [4] Cai Hongya, Gou Zhanping. Thinking Research on the Project Management of College Students' Innovation and Entrepreneurship Training. Education Teaching Forum. 2018,pp.12-15.
- [5] Che Hui, Zhang Yuan. The Cultivation of Students' Ability by the Undergraduate Innovation Training Program: Taking the Insurance Major Project of Shenyang Aerospace University as an example. Innovation Education. 2015. pp.121. DOI: CNKI: SUN: CAIZ.0.2015-13-10