

On Cultivating Innovative Spirits of China's College Students in Science and Technology

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Abstract: Improving self-innovative abilities and building an innovative nation is the development strategy of China, which are also the key point for upgrading comprehensive state strength. Innovation in science and technology is an endless power for the progress of one country and a nationality. Being backbone on state's construction, students in higher-education schools should attach much more attention to the cultivation of innovative spirits in science and technology, in order to meet the requirements of this fierce-competition era. This paper highlights the significance of college students' innovative spirits in science and technology and puts forward some thoughts about how to cultivate college students' innovative spirits in science and technology on the basis of existing problems of college students' innovative spirits in science and technology.

Keywords: college Students; innovative spirits in science and technology; problems; counter-measures

1. Introduction

The former President of PRC Jiang Zeming once pointed out that "Innovation is the soul for the progress of one nationality and the endless power for the prosperity of one country". "A nationality without innovative abilities will find it very difficult to stand out among the advanced nationalities all over the world." "What's the most important to meet the future challenges in science and technology is continuous innovation and courageous innovation." It can be concluded from these words that innovation is closely linked to the development of science and technology. Innovations are also deeply connected with the great rejuvenation of the Chinese people. Being state's backbones, college students should attach more attention to cultivating innovative spirits in science and technology.^[1]

2. Meaning of Cultivating College Students' Innovative Spirits in Science and Technology

The document issued by the State Council of Central Committee of Communist Party of China on deepening the reform of education and promoting quality education in an all-around way clearly declared: "Innovative abilities, practicing abilities and enterprising spirits should be highly paid attention to and humanities cultivation and scientific quality need to be widely promoted in higher education." It has been proved by the practice that scientific and technological innovative activities among college students can not only culture students' various capabilities, but also play a significant role in cultivating and strengthening students' scientific attitudes, values, learning interests and constancy of purpose. Therefore, cultivating contemporary college students' innovative spirits in science and technology possesses very important prac-

tical meaning and deep historical meaning for individuals of students themselves and for the state and even for the whole world.^[2]

2.1. Cultivating College Students' Innovative Spirits in Science and Technology is the Demand of Cultivating Higher-Class Talents in Science and Technology

Being at the preliminary stage of socialization, China's construction of market economy urgently needs innovative talents. Innovative talents can become working backbones of China, respond to various complex activities of market economy and get more opportunities for development. Hence, facing to fierce market competition, college students increasingly need to be talents of comprehensive qualities who possess innovative abilities at core. Cultivating college students' innovative spirits in science and technology becomes their own needs for growing and being talents. It has highly activated their passion for innovation and enterprising. College students have strong sense of responsibility and awareness for being talents as well as strong sense of crisis and awareness of competition. They have high demand on self-realization, ready to accept new things, eager to devote themselves to practical activities of scientific and technological innovation in order to satisfy their own interests, promote their adaptive capacity. Also, they are eager to stand out from the market competition and realize their own values by learning and taking advantage of science, culture and knowledge in a wider range of practice of scientific and technological innovation.^[3]

2.2. Cultivating College Students' Innovative Spirits in Science and Technology is the Demand of China's Construction of Socialist Modernization

In the fierce competition of international politics, sci-

ence, economy and military, China can only be forced to stand at the lower stage of international industrial specialization. We can only make thin profit by higher resource consumption and cheap labor power. Being lack of core technology and independent name brands, market-for-technology development strategy has not brought about fundamental promotion in China's technological innovative abilities and industrial core competitiveness. Hence, as long as China wants to have its voice right on international competition, innovation in science and technology should be at core in building innovative country. And it is known to all that the foundation of innovation on science and technology lies in talents. The quality and quantity of one country's talents directly influence its development of productive force. Who takes possession of more innovative and high-quality talents can take the initiative rights in the competition. However, to contemporary college students who shoulder the mission of rejuvenating Chinese nation, they have a long way to go. Only by cultivating high-degree innovative spirits in science and technology and inspiring them to bravely innovate during the practice of learning and working can college students build socialist modernization and realize the great rejuvenation of Chinese nation.^[4]

2.3. Cultivating College Students' Innovative Spirits in Science and Technology is the Demand of World's Common Prosperity and Development

The trend of the contemporary world is multipolarization and economic globalization. This is the requirement of our times, which is in the interest of the people all over the world. Every country makes economic development their priority. The world's economic life is increasingly globalized with mutual communication and interdependence among every country being increasingly deepened. However, in the meantime of progress of human society and quickened development of world's economy, all the countries are also facing up to many other common problems like the deterioration of human being's surviving environment and global warming. All these problems cannot be solved simply by only one country's power. We need to protect the Earth through common efforts and cooperation all over the world with advanced science and technology. Being a developing country, China's development in science and technology is relatively slow, compared with those developed countries. That demands contemporary college students to enhance the knowledge, fill the brains with lots of information and new knowledge as well as creative abilities in comprehension and utilization. Only by setting up one force of innovative talents in science and technology, guided by outlook of scientific development can we positively promote the harmonious development between human and nature and finally solve the crisis of ecological environment.

3. Current Situation and Existing Problems of Innovation in Science and Technology of Contemporary College Students

A series of activities have been held in the field of innovation in science and technology of contemporary college students in recent years for responding to the appeal of building innovative nation, creating healthy and positive science and cultural atmosphere on campus, improving college students' innovative capabilities in science and technology and encouraging students' passion for scientific innovation in higher-education schools. For example, China has held various "Challenge Cup" contests among college students, which play a positive role in leading students' awareness of innovation and cultivating their innovative abilities. However, it is still at explorative stage on cultivating college students' innovative abilities. Some existing problems cannot be ignored at the back of our achievements.

3.1. College Student's Lower Awareness with Little Originality in Participating in Scientific and Technological Innovative Activities

Firstly, China carries out "examination-oriented" education, which pays particular attention to knowledge in the books. College students' innovative abilities have been neglected and traditional views about knowledge, education and learning have not been fundamentally changed. Many students fix their learning as "passively-accepted" study. They have not realized the importance of "creative" study. Therefore, they don't devote their time to enhancing and comprehending the knowledge. They cannot efficiently put what they have learned into the practice. Their awareness of appreciating science and bravely carrying out new scientific and technological activities are still very weak. Some college students take initiative in the pursuit of scientific and technological innovation and have strong curiosity and desire for study over new things. However, due to their narrow scope of knowledge and thinking, it is usually the case that they turn back along the way of pursuing scientific and technological innovation and feel a strong sense of frustration which gradually consumes their passion for innovation and decreases their innovative activities.

Secondly, some college students' scientific and technological innovative activities originally derive from their teacher's research programs. Generally they passively execute the task from their teachers and seldom design their own technological route by independent thinking. So there is little originality in their programs. These students lack of professional training and have little systematic knowledge about their research fields. Hence, even there are several original programs, the final research has only little practical value or the research itself is something similar to others.

3.2. Insufficient Guidance from Teachers over College Students' Scientific and Technological Innovative Activities and Weak Atmosphere for Innovation

Firstly, lacking of high-level supervisors or teacher's insufficient guidance is a very important reason for low-level college students' scientific and technological innovation. High-level supervisors refer to those who are able to well educate and lead people. They are loyal to their position, care for their students, pay attention to practical society, concern on first-front academic progress, take possession of innovative spirits and have passion for instructing students' scientific and technological innovation. In many higher schools, some college students who possess desires for scientific and technological innovation achieve few successes by their own efforts as a result of lacking necessary instruction.

Secondly, in some higher schools, not all students have the opportunity to get access to carrying out scientific and technological research in the laboratory because of limited experimental equipments and fees. The majority of students have little opportunity to conduct experiment independently, which may lead to weak popularity and universality of many scientific and technological activities. Some students get some excellent achievements and successes in seeking honors for their schools in various scientific and technological competitions and contests. However, they only account for a minute portion of all the college students. Their influence is so limited that they can not lead the development of scientific and technological innovation among all the college students.

3.3. Lack of systematic guarantee and relative inspiring mechanism for college students' scientific and technological innovation

Firstly, many college students have many classes and little extracurricular time, so sufficient guarantee is difficult to make for them to take part in scientific and technological innovative activities. Systematic rules have not been made in many higher-education schools. Actually they regard scientific and technological innovative activities as some random activities. Once they come across some important competition, students are passively organized, without regular training process. Whether students take part in innovative activities or not totally depends on their own interests or hobbies, which makes the promotion of scientific and technological innovative activities very passive.

Secondly, relative inspiring mechanism has not been established for college students' new achievements in scientific and technological innovation in many higher-education schools. No matter for teachers or students, participants' passion and enthusiasm will be deeply weakened without necessary inspiring mechanism.

4. Counter-measures for cultivating China's college students' scientific and technological innovative spirits

Cultivating college students' scientific and technological innovative spirits carries strong times meaning for promoting quality education and strategy of rejuvenating the nation by science and education in an all-around way. That requires us to adopt a series of feasible and effective counter-measures to strengthen the cultivation of college students' scientific and technological innovative spirits.^[5]

4.1. Cultivating college students' awareness of scientific and technological innovation and strengthening the construction of qualified teachers

Firstly, higher-education schools can fully take advantage of various media to propagandize. These media can be columns, bulletins, campus radio, intra-campus TV, campus internet etc. We can also widely publicize among college students by holding class meetings or school meetings so as to create a strong atmosphere of scientific and technological innovation.

Secondly, students should take up the major part in scientific and technological innovative activities. Students' initiative, independence and creativity should be totally activated. Of course, when they conduct scientific and technological innovative activities, instructions from qualified teachers are also indispensable. Teachers need to play a role of instructing and advising students. In those schools lacking of low-level qualified teachers, it is difficult to culture students with high-level scientific and technological innovative abilities. Therefore, schools should attach great importance to developing scientific and technological research among teachers and increasing investment in cultivating teachers' abilities of doing research in order to pave the way for students' scientific and technological innovative activities.

4.2. Fully taking advantage of education in class and positively participating in social practice

Firstly, cultivating innovative talents is the goal for modern higher-education teaching and learning. Teaching and learning in the classroom shoulders very important mission. Higher-education schools should speed up reform of courses, strengthen reform in teaching and learning in the classroom, pay attention to enlightening teaching and learning closely based on teaching guideline, well combine the content in the classroom with social reality in order to make college students know about the first-front world scientific and technological innovation by teachers' lecturing in the classroom. At the same time, in the process of teaching and learning, attention should be paid to make students realize their leading role so as to culture their independent learning and research.

Secondly, cultivating students' innovative abilities cannot be done simply by teaching and learning in the

classroom. Innovative spirits like frequent thoughts with brains, brave practicing and courageous exploration should be highly cultured. Scientific and technological innovative practice is an important bearer for cultivating college students' scientific and technological innovative spirits. It is also an important method to realize the educational target of scientific and technological innovation. Popular and competitive activities should be widely developed among college students. With college students' extracurricular scientific and technological competition and lectures on science and technology being the main form, a platform of college students' scientific and technological innovative project should be constructed so as to positively carry out a variety of extracurricular academic scientific and technological activities.

4.3. Building complete scientific and technological innovative mechanism for good systematic guarantee

In the first place, higher-education schools should gradually make perfected policies to supply hardware guarantee for college students' scientific and technological innovative activities. Laboratories should be accessible for college students and relative expenditure be guaranteed. Also, particular fund for students' scientific and technological innovation needs to be set up to support students' research in order to guarantee the conduction of scientific and technological innovation. Secondly, higher-education schools also should form effective inspiring mechanism in the fields of research application, evaluation, management of competitions and award and punishment. For example, taking part in scientific and technological innovative activities can offset academic credit.

For those who have achievements of scientific and technological innovation, material and spiritual awards need to be given to them so that they can feel the real interest brought by scientific and technological innovation. When their initiative is inspired, scientific and technological innovative activities can be sustainable.

Based on contemporary international competition and strategies for China's socialist modernization development, college students should attach more importance to cultivating scientific and technological innovative spirits, continue to work hard and take exploration. They also should try to make themselves totally qualified innovative talents under the principle of "pursuing science and true knowledge, bravely innovating and facing up challenges".

References

- [1] Cui Bin, Xie Wei, "Exploration and practice of college students' scientific and technological innovation", *Research on Continuous Education*, 2009.2.
- [2] Zhu Xinli, "Thinking over cultivating college students' scientific and technological innovative abilities", *Journal of Henan University of Technology*, 2009.3.
- [3] Zhong Jun, Liu Zhifeng, Liu Feng, "On strengthening college students' scientific and technological innovative spirits", *Research on Heilongjiang's Higher Education*, 2005.9.
- [4] Deng Jianping, "Tentative reasoning on cultivating college students' scientific and technological innovative spirits and abilities in new era", *Journal of Ningbo University*, 2004.2.
- [5] Wei Junwen, "Pioneering new approaches to higher-education schools' moral education with college students' scientific and technological innovative activities", *China's Education of Electric Power*, 2009.9.