

Some Thinking about Cultivating Innovation Ability of Students in Process Equipment and Control Engineering

Yongbin Lai, Xiu Chen, Zhang Xin, Guang Wu, Xuebin Li, Yijun Zhou and Long Wang

Anhui University of Science & Technology, Anhui Huainan, China

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Abstract. Training and improving innovation ability of university students is the need of the times and social development. It is the need of higher education development and College Students' development. The innovation ability of university Students determines the innovation ability and competitiveness of the future of a country to a great extent, so the cultivation of creative ability of students is an important task of modern universities. In this paper, the cultivation of innovative ability of students in Anhui University of Science and Technology, who major in Process Equipment and Control Engineering, is taken as an example and some thinking to develop the innovative ability of college students are put forward.

1. Introduction

Innovation ability is the ability to generate new knowledge, new ideas and create new things. It relates to many kinds of ability of a person, such as cognitive ability, observation ability, memory ability, judgment ability, analysis ability, imagination ability, experiment ability, self-learning ability, ability to absorb knowledge, information ability, which is the concrete manifestation of comprehensive ability of a person. And the cultivation of innovation ability include making the students learn actively in school, have the ability to obtain knowledge independently, have the ability to creative learning, generate creative awareness, etc. But more important is that it makes the students out of school become builders with social initiative and creative spirit [1].

The name of Process Equipment and Control Engineering shows the interdisciplinarity of its major, which covers Chemical Engineering, Mechanical Engineering, Control Engineering and many other disciplines, so the students of this major with the characteristics of comprehensive talents, can be engaged in the related work above. But also because of this major covers a wide range, during a survey to previous graduates, we found that the requirement of enterprise to comprehensive quality of students is relatively high, and enterprise values the ability of solving problems independently and continuous learning. It puts forward higher requirements

on college students to form stronger innovation ability and practice ability.

In this paper, the cultivation of innovative ability of students in Anhui University of Science and Technology, who major in Process Equipment and Control Engineering, is taken as an example. It sums up working practice on how to stimulate the innovation consciousness of students in this major and how to improve the innovative ability of college students. We have the following several aspects of experience and thinking, and put up to discuss with you.

2. The Cultivation of Innovation Ability is a Gradual Process

The innovation ability of the college students as a developed and dominant creativity, through the learning and training of university, which can get exercise and improve. But also, it should be saw that effectively improving the innovation ability of university students is a complicated and difficult system engineering education, which must be carried out in the whole process of undergraduate education [2]. From the beginning of the first-grade students, we must proceed to the training. And during the whole period of university, the training should be hierarchical, Sub-objectives, gradual,

and targeted, ultimately achieving the purpose to enhance the innovation capability. For the students of grade one or two, the main task is to learn professional basic theoretical knowledge and innovation "cognitive" training. Years of practical experience tells us: solid theoretical basis is the foundation and prerequisite of the cultivation of innovative talents. Process Equipment and Control Engineering is a major which covers multidisciplinary content. And curricula should not only focus on students' generous theoretical basis, but also consider the students' wide range of interests and perspectives. Innovation is the premise of training the innovation ability of students. Only under the guidance of the strong sense of innovation, can students produce strong motivation, set up the goal of innovation and give full play to creative potential. Therefore, at this learning stage should let students understand the scientific and technological innovation, generate the interest of technological innovation activities and cultivate innovative consciousness and innovative quality. According to the students' different interest, who are divided into several innovation and interest groups. And teachers are specified for each group. It mainly to develop their abilities of discovering problems, data collection, literature, team work etc. For the students of grade three or four, the main task is to cultivate and improve the innovative ability. The stage trying to make many students can be generally involved in simple technology innovation activities, experience the fun of innovation, deepen the understanding of major, and enhance the practical ability, innovation ability and team spirit. At the same time, the students who have strong ability, can also directly involved in the actual Scientific research project, to cultivate the ability of comprehensive to use professional knowledge, independent thinking and problem solving.

3. Combining Scientific Research and Teaching and Constructing Academic Exchange Platform is the Assurance to Train the Students' Innovation Ability

In research and teaching university and the research university, teachers are not only the imparters of knowledge, but also the main participants in scientific research activities in universities. And teachers are not only the initiator and lead of the college student's academic activities, but also the driving force for the college students of science and technology activities [3]. Scientific research results going into the classroom, which helps students establish advocate scientific thought, is the route must be taking to the cultivation of innovative ability of students. Professor and associate professor on the platform give the undergraduate class, who can put their achievements in scientific research, scientific research work experience, the engineering practice experiences and engineering case to students in combination with curriculum. The knowledge must be able to guide the students thinking, inspire students thinking and improve their innovation ability. So, in the teaching process of colleges and universities, the "teach" of teachers should be the combination of teaching and scientific research, and the "learning" of the students should be the combination of learning and research. Then the innovation consciousness and innovation ability of students cultivate gradually.

Research project teaching method is a method based on cultivating innovation consciousness, innovation spirit and innovation ability of students. It can arouse the enthusiasm of students' autonomous learning and actively explore the knowledge, which has a promoting effect to improve the students' ability of applying theoretical knowledge to social practice, making the improvement of classroom teaching quality improved [4]. Classroom topic can come from teachers who put forward some reference topic according to the teaching aim and students' cognitive ability, but also from the students to develop their own. The aim of all these subjects is to improve the ability of students to discover, analysis and solve problem. In activities, to stimulate students' learning motive power, students should be taken as the center, which can not only cultivate the ability of active learning and independent inquiry, but also cultivate the ability of teamwork, leadership and organization.

The broad field of vision is the source of innovative technology. Constructing a multi-subject, multi-level and multi- forms academic exchange platform in the university plays a very important role in the formation of innovative consciousness and the improvement of innovative ability. By offering the innovation courses of science and technology, holding science and technology innovation and entrepreneurship lectures, opening a variety of ways, strengthening the contact with

society, schools should let college students go out of the school and get the source of invention from the production practice [5].

4. Participating in the Research Projects of Teachers and the School Scientific Research Activity is The Effective Way to Cultivate Students' Innovation Ability

Students participate in research activities, learning through reasoning and practice by their own, which can train their innovation ability and practice ability and broaden the fields of science knowledge. Many domestic universities have found scientific research activities can effectively cultivate students' innovation ability. At the same time, students can fully realize the scientific innovation is not too high to be reached, and the system is not necessarily huge, which may be a report to discuss a problem or a phenomenon of professional analysis. It is completely feasible for students to use their professional knowledge on a smaller field to do a low-level research.

The research laboratory opening to students is the effective way to cultivate students' innovation ability. Let students go to the laboratory independently and spend their appointment spare time, weekends and holidays in doing experiments and exploring. Subjects can be derived from the students in class not solving problems and the needs after students to participate in work or a small topic in the study of teachers' teaching and research. In the open lab, steps from putting forward the subject, finding and collecting data, medicine instrument configuration, designing the experimental scheme to the exploration of complex problems and any other steps all need students to participate personally and think actively. It can make students' subjective initiative into full play and train student's independent consciousness, innovation consciousness and creative ability. Our school opens nearly 100 research laboratory every year, using two-way selection between teachers and students, in order to promote college students to go into the laboratory, to participate in the research of teachers, which broadened the horizons of students and improved the ability of innovation.

College students' scientific and technological competition is a competition to test the basic theory knowledge of a certain subject and the ability to solve practical problems of students. It is a mass science and technology activities for students and is one of the signs of the quality of talent training, which has direct effect on the employment of students. College students' science and technology competition has the vital significance to stimulate interest and potential of students and to cultivate students' practical ability, innovation ability, entrepreneurship ability and team spirit. At present our school has established the Mechanical Innovation Design, the Energy Saving and Emission Reduction, the Mathematical Modeling, the Program Design and the "Challenge Cup" and other games, which effectively stimulate the students' competition enthusiasm and creative potential.

Practice is a remarkable characteristic of College Students' scientific research innovation, only widen the innovation platform can provide students with more opportunities for hands-on practice. Universities can widely establish innovation practice base for students, let students participate into practice as much as possible to achieve the combination of theory and practice. Meanwhile, universities can establish long-term cooperative innovation practice bases by uniting extramural research institutions, enterprises and institutions; carry out various scientific research activities and let students have more opportunities to cultivate the scientific research innovation ability. The school signed a cooperation agreement with the chemical fertilizer plant, the plant provides experimental base for the process equipment and control engineering students, and at the same time, regard their production line as the foundation of students' graduation projects or innovation subjects. It has achieved remarkable results in the innovation practice.

5. Conclusion

Students' innovative ability occupies a pivotal position in Higher Education, also is an important goal of college student's quality education. But we should also see that the students' innovative consciousness and innovative ability cultivation is a long-term and systematic project, not overnight. We should carefully analyze the main factors of students' innovative ability cultivation, recognize the

deficiencies of current higher education in training students' innovation consciousness, then suit the remedy to the case, adjust and reform timely, create a set of education models and teaching methods conducive to cultivate college students' innovative consciousness, create a set of education models and teaching methods conducive to cultivate college students' innovative consciousness, could make the college students cultivate the innovative consciousness, improve the rapid increase of their own innovative ability, foster a generation of innovative talents with good innovative consciousness in higher school.

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Corresponding Author: Yongbin Lai, yblai@163.com.

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7. References

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