AC 2011-193: CULTIVATING INNOVATIVE TALENTS OF MINERAL PROCESSING ENGINEERING BASED ON THE ADVANTAGE OF NATIONAL KEY DISCIPLINE

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Cultivating Innovative Talents of Mineral Processing Engineering Based on the Advantage of National Key Discipline

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ABSTRCT: The importance of innovative talents cultivation for mineral processing engineering is discussed. From the new training program of mineral processing specialty formulating and implementing, the thought of innovation talents cultivation for mineral processing engineering was discussed. It is suggested to construct the research subject curriculum system, play the role of teaching masters in education, respect students' personalized development, transform scientific research achievements into teaching resources, insist on the combination of teaching with production and scientific research, and carry out international cooperation as the important means of training innovative talents for mineral processing engineering.

Keywords: Mineral processing; Discipline advantage; Culture of innovation; Personnel training

Introduction

The universities are an important base of training innovative talents. With the progress of science technology and the development of the society, the way of personnel training is already from simple and specificity to complex and creative. The professional training objective of higher engineering education is correspondent with the modernization construction request of our country, improving the comprehensive qualities especially innovation quality of students has been an important task of talents cultivation in universities.

The Practice of Cultivating Innovative Talents for Mineral Processing Engineering

Cultivating Innovative Talents Based on the Advantage of National Key Discipline. China University of Mining and Technology, attributed to Ministry of Education and one of the national keystone universities is a university to undertake the innovative science projects defined by the national Project 211 and Project 985. Mineral processing of China University of Mining and Technology is the earliest one of the establishment of the professional school. Created in 1952 and establishing mineral processing engineering start a new era of China's first generation of Masters, Ph.D, the first generation of "Chang Jiang Scholars Program"

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chair professor qualification, in the long-term teaching and research practice, it has formed a series of national key disciplines with its own distinct characteristics and coal processing and utilization as the main direction. In 2008, teaching faculties of mineral processing was appraised as national leading teaching team, and mineral processing has been evaluated as characteristic major by Ministry of Education and as the top engineering subject in our state. "Science of Mineral Processing" and "Coal Preparation Plant Design" were appraised as national Exquisite course respectively. in the long-term teaching and research practice, it has formed a series of national key disciplines with its own distinct characteristics and coal processing and utilization as the main direction .

Discipline relies on personnel training. High-quality talents depend on the construction of a high level of discipline. At the same time, high-quality talent is the key to the construction of a discipline. Therefore, in exploring the process of building an innovation talent, mineral processing always adheres to the "equal emphasis on discipline construction and personnel training" principle, as well as grasps the focus of the subject construction. With many years' constant efforts, we have built an innovative personnel training system which is characterized by building industry leading subjects and cultivating multidimensional innovative talents; as well as made high stuff innovative talents as a chief target of major building[1].

Constructing Research Curriculum System, Exploring Innovation Teaching Mode. The undergraduate curriculum is the guarantee to the innovation awareness and innovation of students. Mineral processing engineering is dedicated to the pursuit of curriculum development and reform, and explores innovation and experience of teaching model throughout the process. 2008 was a critical year for the constitution and implementation of the 2008 edition of undergraduate training program, the 2008 edition of undergraduate training program as an opportunity to the it's development. We strived to bring innovative theory of education into the teaching program, to implement the entire process of innovative ideas and innovative culture for undergraduates. 2008 edition of Mineral Processing Engineering to the undergraduate training program sets up two new seminar courses as "China's energy resources and their thinking" and "Mineral processing innovation and practices", whose focus is to bring innovation consciousness and innovative ability to undergraduate students. For example, in mineral processing engineering innovation and practice courses, the teaching task is conducted by the professors, Ph.D supervisors and teachers with independent innovation achievements. Teaching process comes from the basic principles of physics, chemistry and mechanics and proposes innovative prototype. With mineral processing technology and equipment as the carrier, each unit should teach and discuss a specific process and all aspects of equipment prototype, development, innovation and application, so that students can feel the whole process of scientific and technological

innovation, with emphasis on student's cultivating innovative ideas. This approach allows the undergraduate students to be involved in the whole process of innovative experiences. On this basis, the results demonstrate innovation disciplines, so that students can not only contact the mineral processing engineering expertise, but also experience the process of technology and equipment, innovative thinking. It also enhances the interaction between freshmen and their teachers, and improves the student's professional interests, increase their professional pride, and lay a solid foundation to the following professional courses of study.

For the sophomores and juniors, the subjects actively involves the students in national, Jiangsu Province and China University of Mining University students' innovative projects, as well as teachers of the research projects, so that most of the students can truly participate and cultivate their innovative thinking from the conscientious. It was with such a foundation, for college senior, mineral processing courses have included such engineering practice areas as "pilot study of methods", curriculum design, graduate design etc. This allows the lab classes to be a separate class in the true sense. This is a significant change to the original irrelevant combination of experimental courses. In general, it cultivates student's innovation awareness and ability in practice.

Playing the Role of Master, Promoting Innovation Consciousness Training. We know that a famous teacher can cultivate an excellent student. Talent cultivation of our higher education cannot succeed without the guidance of the masters and the experts. At present, there are two academicians of Chinese Engineering and 2 winners of national outstanding youth fund, 3 minister of education chair professor chang-jiang scholars program, three provincial teaching masters. The personality and knowledge charm of academic masters are kind of profession's virtue requirements of both socialist-minded and professionally competent which used to be advocated, and higher requirements under the situation of the innovative talent training. The academic style and struggle spirit of academician Chen Qing-ru who is a coal preparation experts and senior academician inspired a session of college students' innovative spirit and seeking knowledge desire. Students can benefit a lot from experiencing and listening to academician, teaching masters and a large number of professors or doctoral instructor, at the same time, we will invite domestic or foreign famous experts and scholars giving the report for minerals processing students each semester. The students' innovation enthusiasm was stimulated by the example of masters' language & action.

Respecting the Students Individuation Development, Excavating the Potential of Creative Talents. The cultivation of innovative consciousness and ability for students will not successful if without student give full play to individuality in the growth process, at present, the demand of the diversity and personality education for students increasingly urgent. How teach according to the differences of the students' learning interest and ability is

an important breakthrough of ensuring our education quality and innovative talents cultivation. For many years, mineral processing professional adhere to the comprehensive development for students as a target, respecting individuality development, at the same time, according to the country and the enterprise needs, the personnel training mode such as the credit system, minor system, undergraduate and graduate merger system and combined training of "2+2" were explored and established, maximum talent innovation potential was explored, and the different type of high-quality talents were created in greatest extend. In recent years, minerals processing professional also carry out the personnel training new mode of double tutorial system in the graduation design process and the "international cooperative ", etc. Not only meet the demands of students' diversification and individuality, and cultivate high quality talents for the enterprise [2~3].

Encouraging Transformation of Scientific Research Achievements into Teaching Resources, Promoting the Innovation Education Development. With the talent training and the knowledge innovation as the goal, the mineral processing specialty encourages teachers actively transform the latest achievements of scientific research into the undergraduate teaching process. All of the Ph. D. advisor, professors and scientific research backbone teachers in our discipline undertake undergraduate teaching task, most of the achievements in scientific research has been transformed into teaching resources. From updating classroom teaching knowledge to constructing the undergraduate experimental platform, much of these are derived from the professional teachers' scientific research achievements. For example, the bench and the pilot test equipment and system come from the teachers' scientific research achievements, many topics of undergraduate graduation design (thesis) come from teacher research projects, it provides good condition for cultivating high-quality talents, and also promotes the teaching good development.

Adhere to Integrate Production, Teaching and Research, Broaden the Channel of Cultivating Innovative Talents. Teaching and research are the two main functions of the modern university. The merging of teaching and research is even more relevant to the current development strategy of research universities. Relying on solid academic disciplines mineral processing theoretical basis and taking advantage of a high industrialization degree of scientific and technological achievements, the school cooperates with institute and coal processing factory closely, and strengthens the penetration among the teaching, research and production. After recent years of exploration and practice, we have found a number of effective methods to solve difficult practical teaching problems, which have explored a new path.

In recent years, firstly, we have effectively strengthened student's capacity-building efforts in engineering practice, including the three internships and engineering training, and also paid more attention to the building of practice bases and the engagement of external experts to explore a new high-levels path of innovation and personnel training, integrating production, teaching and research. For the cultivation of ability in engineering practice, we have taken the in-out way so that mineral processing students can feel the nurturing and

training in engineering practice truly. Secondly, we have invited experts and design masters in the field during the graduation project, and to have students engage in special report. For example, for the problems of process and equipment in “concentrator design" courses, we invited design expert Dai Shao-kang and Deng Xiao-yang to resolve coal preparation design specifications and analyze classic design cases for seniors. Engineering design innovative ideas of experts and masters play a tremendous role in innovative sense and creative enthusiasm among college students. Thirdly, we insist on walking out in three and graduation design of some students, and penetrate into workshop of coal and mineral processing factory, especially in graduated internship links, ask the students to study and practice with task and their own design subject. Meanwhile, we also encourage graduate design (thesis) topics to relate engineering practice, so that the entire course of design or research process can be conducted out of school with external experts’ guidance and production, teaching and research can be combined to broaden the ways of cultivating innovative talents.

To Explore New Education Initiatives with International Cooperation, and Strive to Foster an International Competitive Innovation Talent. Running a school internationally is one important strategy to realize the development by leaps and bounds, which means building an advanced combination of world-class universities operating in a modern university system, form a full part in international competition of the system and cultivate innovative talents with international competitiveness. At present, China university of mining and technology, the university of Kentucky, Germany university of Duisburg and Australia university of Queensland had a successful cooperation. They carried out in undergraduate "2 +2" training mode and selected graduate students. At the same time, we send a large number of outstanding young teachers to study abroad of distinguished universities to study and take part in scientific research and under the guidance of first-class professors, to have international cutting-edge research projects and study every year. Its purpose is to learn foreign advanced teaching concepts and research tools, fully absorb foreign high-quality educational resources and technological resources, and strive to foster an internationally competitive creative talent.

Conclusion

With the national key discipline supporting, minerals processing engineering has accomplished remarkable achievements in innovative personnel training. In recent years, We have achieved respectively two teaching achievement prizes at the state level, and one special prize, two first prizes and one second prize at provincial level. We have two national fine-designed courses, and won five consecutive awards at the national university "Challenge Cup" competition in extra-curricular academic work of award-winning science and technology. there have been six students who received outstanding undergraduate students on graduate design in Jiangsu province. We won the national natural science funds innovative groups in 2009, and became the minerals processing specialty which first passed accreditation of engineering education in China education ministry at oct. 2010.

Acknowledgment

The authors wish to acknowledge the National Natural Science Foundation of China

(Grant No. 50921002), Ministry of education ("The construction project of professional characteristics ", Grant No. [2007] 25) and Ministry of finance ("national teaching team" construction project, Grant No. [2008] 19).

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