Discussion about the Cultivation of Humanistic Quality of Science and Engineering Students

Ying FU\textsuperscript{a}, Chi ZHANG\textsuperscript{b,}\textsuperscript{,} Lei WANG\textsuperscript{c} and Huan YAN\textsuperscript{d}

Harbin Institute of Technology, Harbin, China

\textsuperscript{a}fuyinghit@hit.edu.cn, \textsuperscript{b}zhangchi@hit.edu.cn, \textsuperscript{c}jtsnjh2016@163.com, \textsuperscript{d}yanhuan@hit.edu.cn

Keywords: University of Science and Technology, Humanities Quality, Education and Cultivation.

Abstract. Universities generally play a most important role in educating the students with both professional knowledge and literacy quality to make them talented people with innovation. However, it seems that the current students in the universities, especially in the colleges of science and engineering, didn’t show the expected humanistic qualities sufficiently. This paper expounds the significance as well as the importance of humanistic quality education in Universities of science and engineering, and it puts forward some ways on how to carry out humanistic quality education.

Zhou Yuanqing, the former Vice Minister of the department of education of China, pointed out that there would be no first-class university without humanities education. “We should understand the fundamental influence of national education on cultural heritage and innovation so that the university could become an important cradle of training a large number of highly qualified personnel who can pass down the culture with innovation effectively.” At present, as far as the current situation of higher education in mainland China is concerned, the humanities quality education has not been paid enough attention in the higher education because of the one-sided emphasis on science and technology in most of the universities, which makes their students, especially science and engineering students, lack of humanistic quality. Lack of humanities quality seriously restricts the healthy growth and all-round development of college students, which is contrary to the objectives of college education. Thus, it is an urgent task for higher education to strengthen the humanistic quality education and improve the quality of personnel training.

The Connotation and Significance of Humanistic Quality Education

The word “humanism”, was found initially in the Chinese ancient “Yi Jing”, which said that through the observation of celestial phenomena, Saints could understand the timing changes; through the observation of the various phenomena in human society, man could use the reformatory education means to govern the world. The “humanities” here, referring to the culture that human created, was the comprehensive result of the human ability, methods and achievements during the practice. It was not only embodied in those substances, but also in the system and spirit of a country.

At present, there is no clear definition to “humanities quality education” in all kinds of literature. Some scholars define it as “the humanities quality education is to transfer the excellent cultural achievements of mankind through knowledge imparting, environmental influence and other routines, so that it can be internalized into the personality, temperament and accomplishment”. Some scholars also summarize it as follows: “the humanities education aims at training the students’ humanistic spirit and enhancing the students’ humanistic quality.” The main contents of the humanistic quality education include moral education, aesthetic education, traditional culture and education, science and technology and social education, legal and economic base of knowledge education, literature, history and philosophy basic knowledge education, psychological and personality education etc. Strengthening humanistic quality education of college students can contribute to students' innovative thinking ability, to the improvement of the comprehensive quality and comprehensive and free development [1].
The Importance of Strengthening Humanistic Quality Education for Science and Engineering Students

Strengthening the Humanistic Quality Education of College Students Is the Need of the Development of the Epochs

Due to the highly differentiated and integrated characteristics of most subjects nowadays, and the establishment of a series interdisciplinary, multidisciplinary, cross disciplinary disciplines, science technology and humanities crisscross indiscernibly in the application and development of all subjects. So it is the result of the development of the discipline to strengthen the humanistic quality education of science and engineering students. In this case, when faced with thorny problems, only the student with comprehensive quality with arts and science aspects can handle them with high efficiency through the best perspective and optimal method. On the other hand, the students cultivated by higher education should not only hold firm professional knowledge and skills, but should have broad scientific vision and wide area of knowledge as well. Good psychological quality and sound personality, meanwhile, are indispensable. For these reasons, we must turn the point from the full attention on science and technology to the education of humanities and social sciences [2].

Strengthening the Humanistic Quality Education of College Students Is the Important Part in Making Talented Personnel

In contemporary, the evaluation criteria for a talented person are not only just the skills and his scientific and cultural knowledge he owned, but also a comprehensive quality as well. That is to say, students must grasp the knowledge well and be good at innovation at the same time. They should know how to do their work, how to be a man with prominent practical ability, teamwork cooperative and dedicated spirits. Humanistic quality education, not only can help college students directly accumulate humanity knowledge and improve their practice ability, but also can broaden the horizon and edify their minds. Moreover, it helps them to form correct values and outlook, stimulate them to enhance their sense of responsibility and courage to dedicate to society. Thus, strengthening the humanistic quality education is a way to make it possible to cultivate the talents to adapt to the times and promote the development of the times.

Strengthening Humanistic Quality Education Is the Common Trend of Higher Education Reform and Development in the World

In the process of the reform of higher education, from the point of view of the world, the United States and Japan paid more attention on penetrating science and technology subjects, combing arts and science and strengthening humanities curriculum construction. On one hand, they reinforced the science and technology education and stressed on the teaching and application of computer. On the other hand, they generally increased the humanities courses, and infiltrated them into all the professional education. And in this process, they emphasized the importance of strengthening social science education in science and engineering education fields in particular. Taking the Massachusetts Institute of Technology (MIT) as an example, they claimed that each undergraduate student must complete 8 courses in the humanities, arts, and social sciences, the credits of which accounted for less than 20% of the required credits for their graduation. Another case is Harvard University, requiring all students to take 8 courses from the subjects about history, philosophy, literature and art, social analysis, ethics and foreign culture before graduation. Similarly, in the school of mechanical engineering of university of in Tokyo, the compulsory course of general education curriculum was no less than 44 credits, and the humanities and social sciences were accounted for about 20 credits. Therefore, reinforcing the quality education, especially the humanistic quality education in science and engineering colleges, has become the general trend of the reform and development of higher education in the world [3].
Strengthen the Humanistic Quality Education Is Era Demand to Cultivate Students with Creative Thinking and Creative Ability

For quite some time, in mainland China, the middle school education basically carried out examination-oriented education, and neglected the quality education. Subsequently, many universities blindly underlined on science and technology education, leading to the decline of the spiritual realm and cultural quality of their students and the lack of innovative ability. In this situation, the relative educators have seen the urgency of the humanistic quality education for these smart students. In order to adapt to the challenge from the integration of the various disciplines resulted from the rapid development of modern science and technology, they have to strive to nurture college students with knowledge both in breadth and depth, and enrich the cultural heritage. Through a series of measures, they expected their students to establish innovative awareness and creative ability with critical thinking.

Analysis on the Reason for the Lack of Humanistic Quality of Science and Engineering Students

Misconception in Cognition

There is a misunderstanding in the past, that higher education, considered as professional education, intended to cultivate the students with professional quality and specialized skills, such as technical talents, management personnel, doctors, teachers, etc. Human knowledge, however, was powerless in this respect, leading to a phenomenon that for a long time, especially in some professional colleges, the higher education was regarded as a process of teaching and imparting professional knowledge. In addition, people tended to praise the direct contributions of science and technology for the development of the productive forces and the external effect it displayed, while the indirect contributions of humanities and its intrinsic functions in guiding and supporting role to productivity development seemed to slip through people’s eyes.

Curriculum System Is not Conducive to the Humanistic Quality Cultivation

In universities of science and Engineering, a phenomenon was seen common that their curriculum system did not adapt to the quality education, which manifested that curriculum structure was not reasonable with single personnel cultivation mode and humanities courses occupied minor component (not more than 10%) of the total cultivation curriculum, far behind the country with developed education. Compared to the professional knowledge, the students spent only a little time and energy on the humanities and social science disciplines and activities. For students, curriculum function is distorted as a tool to merely cope with the examination, and cannot solve the question on how to conduct themselves, which was the main function of higher education. Teaching tended to indoctrinate the students with ready-made conclusions or formulas, and this model lacked the process of channeling them to reflect about the contents they received in a rational manner in the atmosphere fulfilled with humanistic spirits [4].

The Ways and Mechanisms of Humanistic Quality Education for Science and Engineering Students

Reform the Humanities Curriculum, Optimize the Curriculum System

According to the survey statistics from 30 colleges of science and engineering, the courses of humanities and social sciences are accounted for less than 10% of the total teaching plan, far below the level of 20% in the countries with developed education. In order to support the students to win in the fierce competition in future, we should plan to open the humanities and social science classes as compulsory courses or elective courses, including history, philosophy, art, ethics and other
humanities, and pay more attention on the cultivation of scientific spirits, way of thinking and creative ability in the education programs. Moreover, it is indispensable for educators to enhance the students their aesthetic ability to know and appreciate the Chinese and foreign famous literary and artistic works, improving the discrimination ability, and leading them to establish correct world values, life and moral outlook, as well as aesthetic conceptions. Therefore, colleges may encourage their students to minor humanity subjects and pursue double degrees. In this case, it is available for the talents who have possessed excellent professional knowledge and skills to receive a professional education on humanities. Then, these talents could obtain two degrees both in science and engineering and liberal arts finally and become the compound talents with comprehensive knowledge and skills.

**Strengthening the Construction of Campus Culture and Building the Campus Culture with Humanistic Spirits**

Universities should vigorously boost students to hold various kinds of campus cultural activities oriented by humanistic quality. The campus activities, such as holding culture and art festival, designing campus landscape (natural landscape, cultural landscape, history landscape), organizing meeting of reading classic books and culture salon and constructing students’ literary clubs, play an essential role in creating a lively and healthy campus cultural atmosphere. At the same time, colleges are also suggested to reinforce the guidance of social practice and public service activities, which means that they need to merge the humanistic education and quality cultivation into a variety of practical activities, and guide their students to understand the society and current situation of their country, to love their people and nation, to participate in social service and practice vigorously, and understand the concrete connotation of humanistic spirit profoundly in the process of practice. In order to improve the cultural quality of students, colleges could organize various cultural lectures, theatrical performances and cultural festivals, for instance, through guiding students to read classic literary, they could make students understand the meaning of life deeply, and they also can establish associations or clubs of music, dance, sports, painting, calligraphy, photography, literature, speech etc. For the purpose of enriching the physical and psychological quality of their students, they can hold a variety of sports activities and competitions and psychological counseling etc. Overall, the measures mentioned above show the available routes to satisfy student's various hobbies, to enhance their humanistic quality and maintain healthy and optimistic spirits.

**Expanding the Way of Imparting Human Knowledge, Open Multi-Route to Education Penetration**

Teaching in classroom is the main channel for the education system to impart knowledge, but it is limited by the educational system and total class hours. In order to solve the contradiction between the education content and the class hours, organizing humanities lectures in college students’ spare time seems like a good idea. The form of the lecture is free, and the teaching, the question, answer and the discussion are flexible and diverse, which is quite acceptable for the contemporary college students due to their psychological characteristics. Additionally, the lecture is often intensely refined into a two-or-three-hours lecture from a large amount of new information. Furthermore, Lecture speakers are usually masterful experts and knowledgeable, so they are often admired by the students. It is proved that those delicately prepared humanities lectures are greatly favored by students. Again, students are expected to read more literary books actively. Thus, in order to improve students’ quality, it is an effective good way in practice for the institutions of higher education to supervise students to read some classic books listed by school and guide them to take advantage of their spare time on communicating their understanding of reading with others.

**Conclusion**

All in all, to strengthen college students' humanistic quality education is a complicated
engineering system, which needs efforts of all aspects. And changing the education concept and setting a goal of adapting to quality education are the premise of it. Also, we can achieve the goal of cultivation education by means of reforming humanities curriculum system, strengthening construction of campus culture, expanding approaches of humanistic knowledge, and drawing on the successful experience of some science and engineering colleges and universities.

References