Research on the Integration of General History and Professional History Education into Mechanical Courses

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***Abstract*—In the era of big data, we can track and use the data of College Students' living habits, consumption habits and learning habits to timely understand and master the basic situation and ideological trends of college students. This paper uses big data technology to investigate the learning behavior of mechanical college students, and analyzes the employment situation of mechanical graduates. This paper found the problems existing in the current mechanical undergraduate students, and finds that the current mechanical undergraduate students are faced with such problems as weak innovation consciousness, lack of humanistic spirit, low psychological quality and poor social adaptability, which affect them to become qualified engineers needed by enterprises. This paper discusses the function of integrating general history and mechanical history into mechanical courses. The results show that the method can effectively reduce or eliminate the current mechanical undergraduate problems.**

***Keywords*—general history education, professional history education, machinery students, qualified engineer**

I. Introduction

Globally, it is becoming a trend to research and develop big data technology, use big data to promote economic development, improve social governance, and improve government services and regulatory capabilities [1].

In China, industry is the lifeblood and pillar of the national economy [2]. In 2016, the output value of the machinery industry accounted for about 20% of the gross industrial output value of China, and it is currently China's largest industrial industry. This shows that the machinery industry reflects the development of China's industry to a certain extent [3]. At the 19th National Congress of the Communist Party of China, President Xi Jinping emphasized that to develop the real economy, we must develop manufacturing [4]. Currently, the manufacturing sector's demand for mechanical engineering graduates is very urgent. But our mechanical engineering graduates may not be the enterprises that need qualified engineers or excellent engineers. According to the Lausanne report, the number of qualified engineers available in China has been insufficient for a long time [5]. Therefore, the Chinese Ministry of Education has successively carried out Higher Engineering Education Accreditation, Excellent Engineer Cultivating Plan and New Engineering Construction. Many colleges and universities also actively carry out educational reform, in order to strengthen the innovation ability and engineering practice ability of engineering students (including mechanical students), so as to improve the quality of engineering talent training in China.

Therefore, it is urgent to improve the innovation ability, engineering practice ability and social adaptability of mechanical college students. In this case, mechanical students learn general history, so that they can have a sense of innovation and the human spirit [6]. Through the ideological and political construction of professional courses, the professional history education of this major or discipline can be carried out, which can greatly improve the students' awareness of the major and the discipline, and improve the ability of professional knowledge learning and engineering practice. At present, the ideological and political construction of specialized courses for mechanical college students is in its infancy, and the integration of general history education and professional history education is even more insufficient.

The big data theory was put forward by Victor Myer Schoenberg and Kenneth Kukeyer in their book "the age of big data" in mid August 2008. They pointed out that big data refers to the use of all data for analysis and processing instead of the shortcut of random analysis [7].

This paper uses big data technology to investigate the learning behavior of mechanical college students, and analyzes the employment situation of mechanical graduates. This paper attempts to analyze the problems existing in the teaching of mechanical majors in universities, and explore the significance and ways of integrating general history education and professional history education into the teaching of mechanical majors. Some of the survey data are from video survey data such as canteen, library, supermarket and so on.

II. The Problems Faced by Mechanical Undergraduates

A. Insufficient Professional Cognitive Attitude of Mechanical Undergraduates

1) The analysis from applicants

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According to the survey, at present, more than 70% of college students fill in their majors according to the suggestions of teachers, relatives and friends, while less than 30% fill in the major according to their own wishes [8]. It shows that most students do not fill in the form because they like or love their major, but mainly choose their own major according to suggestions of relatives and friends. Friends and relatives who recommended professional, usually only consider whether future employment is good, good pay, easy work, rather than considering the profession is appropriate for the student. It can be seen that most students do not know whether their major is suitable for themselves, and the recognition of their major is also very low.

2) The analysis from the students' understanding of the professional content they have learned

According to the survey, more than 70% of students do not understand the usefulness of their majors and do not have a long-term study plan. For example, in the professional introductory course for freshmen in mechanical engineering, through communication with the students, it is found that most students do not know what knowledge they should master and what engineering practice capabilities they need to achieve. Many students simply think that machinery is drawing engineering drawings, but they don't know that a qualified mechanical engineer needs to master materials, mechanics, tolerance fit, mechanical principle, manufacturing technology, electrical control and other disciplines. They do not know that only mastered the necessary expertise to design to meet the social needs of the user or a qualified mechanical equipment, in order to become a qualified mechanical engineer.

3) Students' understanding of the role of their major in society

Many students do not know the social role of mechanical major after they enter school, and do not know what they want to do after learning mechanical major. Many students are not clear about their future employment direction, and they do not understand the social role of their major and their future development. The reason is that many students don't care about current affairs; they don't pay attention to the development direction of the country; they don't know that since the 19th National Congress of the Communist Party of China, the country has shifted its focus to the real economy, especially the manufacturing industry; and they don't know that the developed countries led by the United States have also formulated policies for the return of manufacturing industry. They do not know that the development of the manufacturing industry is the general trend and the prospects are broad.

B. Mechanical Undergraduates Lack Self-Learning Ability and Innovation Ability

At present, many domestic colleges and universities have realized that the students should adapt to the needs of the society, so they have carried out a lot of teaching reform. However, in the process of cultivating students at this stage, colleges and universities mainly attach importance to the teaching of theoretical knowledge, knowledge instillation and professional knowledge, while despising practical teaching, ability training and comprehensive quality training. As a result, the mechanical college students' self-study ability is weak, the thinking mode is rigid, and the practical ability is poor. Once they graduate, their poor overall quality and weak social adaptability will make it difficult for them to do most jobs [9]. For example, for example, after graduation, many undergraduates have to change jobs frequently due to their lack of ability.

According to the investigation, about 60% of the students have a certain understanding and understanding of the cultivation of innovation awareness and innovation ability, but some students do not understand, blur or simply do not know what is creative consciousness and innovation ability. In the psychological test of the students, 31.2% of the students were found to have a strong sense of innovation [10]. It can be seen that the innovation consciousness and ability of students need to be strengthened.

C. Some Undergraduates Have Problems with Their Psychological Quality

The investigation shows that the psychological quality of college students in China belongs to the positive category on the whole, but it needs to be improved [11]. In particular, engineering students have a strong sense of adaptability and success, but the consciousness of self-control and independence is worrying. The cognitive quality and learning adaptability of male Machinery students are significantly better than that of female Machinery students. In addition, there are structural differences in the psychological quality of college students of different school types, and each has its own characteristics.

D. Some Mechanical Graduates Have Poor Social Adaptability

At present, the poor adaptability of some mechanical students is mainly reflected in the following [12]:

- Some students are not smooth in dealing with interpersonal relationship, such as social phobia, atresia, and love poverty.
- Some undergraduates have deviations in social adaptation to social culture, such as poverty, deviant behavior, and crime.
- Some undergraduates have social adaptation deviations to their social roles, including boredom, poverty and decadence.

Generally, students with poor social adaptability are usually inferior or conceited. In severe cases, they even have communication difficulties with their teachers and classmates. This kind of student will give people the feeling that "this is a poor student with insufficient ability". For an undergraduate who should be optimistic, this psychological gap is very large.

E. *Mechanical College Students' understanding of history and culture*

To investigate college students' understanding of history and culture. Four different grades of our school were investigated through the questionnaire. The number of students in the four grades was 45 freshmen, 48 sophomores, 45 juniors, and 46 seniors. A total of 184 students filled in the questionnaire. All the questionnaires were valid. As shown in Fig. 1.

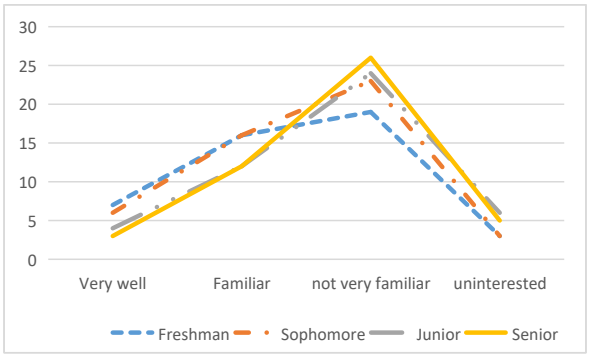

Figure 1. The familiarity of mechanical students with history.

III. The Measures Required

Integrating general history and mechanical professional history into mechanical professional courses can establish a scientific view of history for undergraduates, and correctly understand and treat history [13]. Another purpose is to make current undergraduates realize that every point in time they experience is becoming a part of history, always think about their position, realize that they are in history, and establish a good sense of history. In addition, the main way for undergraduates to learn history is to learn from history [14]. Therefore, it has the following functions to strengthen the education of general history and professional history for mechanical college students.

A. *Cultivate the Innovative Consciousness of Mechanical Undergraduates*

The development process of human society is the process of people's continuous innovation, and a large part of the history of human development is the history of mechanical professional development. With innovation, ancient humans learned to use stone tools, thus entered the stone age, and greatly improved the level of productivity; With innovation, the ancients learned to use fire to process food and obtain calories, thereby getting rid of more diseases and prolonging life; With innovation, ancient people learned to use metal products, invented money, and Commerce began to appear, making the level of productivity get greater improvement. In the 18th century, mankind began the first industrial revolution, and a lot of innovation broke out. More than 100 years later, the second industrial revolution began. The electric lamp and telephone were invented, and mankind entered the "electrical age". It can be seen that the whole process of human development is the process of continuous innovation. New ideas, new theories, and new ways of thinking are constantly found and innovated, and the process of innovation is the development process of innovation consciousness. Therefore, through the study of mechanical history, mechanical undergraduates can understand the generation process of various great innovations in history and the thinking process of people in the innovation process, thereby promoting and enhancing the innovation consciousness of mechanical undergraduates. The participation of mechanical students in discipline competitions in our university. As shown in Fig. 2.

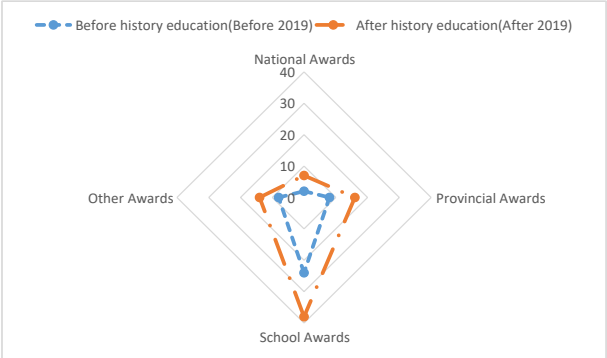

Figure 2. Students' awards of fore-and-after historical education.

B. *The Establishment of Good Psychological Quality for Mechanical Undergraduates*

History can provide people with a comprehensive, comprehensive and rational experience and lessons. Whether in Chinese history or world history, there are too many important events that determine the fate of historical figures at that time. In the various historical events that determine their destiny, what psychological state did the historical figures deal with, so as to either turn them into danger or fall into the abyss? Mechanical undergraduates can analyze the behavior and psychological state of these historical figures through the study of the history, so as to learn from history and establish their own good psychological quality.

Although history and reality do not coexist in the same era and social environment, they have similar and common coherence, which can be examined, verified, associated and predicted. For example, politicians can refer to history to govern the country, while strategists can refer to history to formulate strategies and tactics, and economists can find the basis for promoting economic development from history. Similarly, mechanical undergraduates can also increase their knowledge, literacy and ability by studying history [15].

C. *The Establishment of a Noble and Sound Personality of Mechanical Undergraduates*

Modern pedagogy and psychology believe that "intelligence exists in the whole personality" [16]. Mechanical undergraduates can cultivate their good moral qualities, shape their perfect personality, and fully develop their wisdom through the study of history. In history, there are historical figures with perfect personality, such as Qu Yuan, Yue Fei, and Xin Qiji. They are firm in their beliefs and adhere to their own moral standards, and eventually

become the objects of admiration and worship since ancient times. In history, Qin Hui and Wang Jingwei, who could have strengthened their own beliefs and moral standards, but failed to adhere to them, and eventually became the objects of permanent rejection. It can be seen that the integration of history into the teaching of mechanical undergraduates can be used as the most basic means to shape their perfect personality. It can "take history as a mirror" to cultivate people's moral sentiment, cultivate people's beautiful mind, and promote people's moral quality to be comprehensively and fully improved.

D. The Cultivation of the Team Spirit of Mechanical Undergraduates

The future career of mechanical undergraduates will be based on the construction of various mechanical engineering projects, and every mechanical engineering project, no matter how big or small, is a relatively complex system. In order to solve the complex system problems, we need a cooperative team that can perform its own duties and cooperate with each other. For example, China's high-speed rail projects, aerospace projects, etc., are very huge and complex huge engineering systems, which need the cooperation of a large number of talents and units of different natures to complete the system. It requires our mechanical undergraduates not only to have team spirit, but also to be good at teamwork. By integrating history teaching, students can learn the stories of teamwork in many historical events. Students are required to carefully analyze the cooperation of historical figures in complex historical events, and carefully study the success and failure lessons of historical figures in historical events, so as to establish their good team spirit. For example, after Liu Bang became emperor, Han Xin was named king of Chu. One day, Liu Bang called Han Xin into the palace for a chat and asked him to comment on the talents of the generals in the imperial court. Han Xin said one by one. Of course, Han Xin looks down on those people. Liu Bang listened and asked him with a smile, "In your opinion, how many soldiers can I lead?" "Your Majesty can lead a hundred thousand soldiers." Han Xin replied. Liu Bang asked again, "What about you?" "To me, of course, the more, the better!" As a result, there are two different concepts: more people and more power. The story of "three monks without water to eat" is everywhere around us. Leading troops to fight a war is a technical activity. All branches of arms need to cooperate, and the front-line charge and rear supply need to be coordinated. Only when they are able to make sure that they are as good as their arms and fingers, can they succeed without suffering. This is why Han Xin can lead more soldiers.

If we gather people with different ideas together, we can always expect great things with one heart. On the contrary, even if there are many people, we are just a group of mobs who will collapse at one blow [17]. This is the embodiment of Han Xin's team spirit of good cooperation, not only with team spirit, but also good at making all members of the team establish a good system relationship and cooperate properly.

IV. Conclusion

Based on the analysis of the existence of mechanical undergraduates, this article explores the role of the combination of general history and mechanical history education in mechanical courses. The study found that the general history and mechanical history education for mechanical undergraduates in colleges and universities can reduce or eliminate their current problems.

A. Integrating General History into the Courses

Colleges and universities can integrate the general history education of Chinese traditional culture into the teaching of professional courses, so as to enhance undergraduates' national self-confidence, improve their patriotic spirit, and establish good moral quality and higher psychological quality of students.

B. Integrating the History of Science and Technology into the Courses

Through the integration of science and technology history education on the development of science and technology into the teaching of specialized courses, the undergraduates' understanding of the development process of science and technology, the understanding of the law of scientific and technological research and development, and their scientific spirit and innovative consciousness can be enhanced.

C. Integrating the History of Development of Mechanical Technology into the Courses

By integrating the history of the development of mechanical technology into the teaching of specialized courses, undergraduates' awareness of the selected mechanical specialty can be increased, and their research ideas and the historical development track of this idea can be understood. Through this kind of professional history education, we can make mechanical undergraduates understand the research process and design process of various important mechanical equipment in history, and better understand the various research and design methods currently used in this major.

V. Suggestion

There are many materials available about the history of Chinese traditional culture and the development of science and technology. However, it is difficult to collect the historical data of mechanical specialty in a unified way. It is necessary to organize personnel to collect and sort out relevant data and form a database to further form a course.

A. Collection and Collation of Historical Materials of General History

Through various ways to collect the general history of Chinese excellent traditional culture, and according to the socialist values of classification, for teachers to query and use. For example, most ancient history embodies patriotism, dedication, honesty and friendship. If we want to embody the values of prosperity, democracy, civilization, harmony, freedom, equality, justice and rule of law, we can find them in modern history.

B. The Collection and Collation of the Historical Materials of the Professional History of Machinery

For example, the famous "Toshiba Machine Tool Incident", not only reflects the importance of advanced manufacturing capabilities, but also reflects the rapid development of Japanese manufacturing. Through the analysis of the incident, students understand that in order to break through technical barriers, they must study hard and actively participate in manufacturing.

C. Establishment of General History Database and Professional History Database

In teaching, professional teachers can choose the historical materials or cases that they need and integrate them into the courses.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Conceptualization, writing original draft, formal analysis, funding acquisition: Xun Guan; Investigation, writing – review & editing: Yunjie Xu; Methodology, writing – review & editing: Liang Zhang; all authors had approved the final version.

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