ISSN 2522-6398 Vol. 7, Issue 1: 182-186, DOI: 10.25236/FER.2024.070127

A brief analysis of the enlightenment of "Needham Problem" to current moral education

Zhen Zhen

Chongqing Industry Polytechnic College, Chongqing, China

Abstract: *Since "Needham Problem" was put forward, it has caught the attention of Chinese, and even worldwide academic circles, and the interpretation of and the solution to this problem come in various shapes and forms. Originating from ethics research, this paper itself analyzes morality's relationship with science and technology primarily in terms of ethics, and then reviews the existing problems of current moral education from the perspective of the development of science and technology, thereby providing a theoretical basis and useful reference for our current moral education of college students.*

Keywords: *"Needham Problem", science, technology, ethics and morality*

1. Introduction

What is "Needham Problem"? Why has "Needham Problem" attracted the widespread attention of academic community in China and even in the whole world, and inspired many experts and scholars to put forth their own viewpoints and solutions?

2. The overview of "Needham Problem"

In Needham's *History of Science and Technology in China*, the "Needham conundrum" was raised: "Why did the ancient Chinese, from the 1st century BC through the 16th century AD, develop way more in science and technology than the Europeans of the same period?" "Why did modern and technology not originate in China but in the West in the 17th century, especially in Europe after the Renaissance?"[1]There have been two kinds of heated debates in the academic circle about this problem: One is that Needham Problem does not exist; it is not a problem at all. The other view, however, is that "Needham Problem" does exist and that the research and analysis of it has important implications for development of science and technology in today's China, and serves as a very important subject which we learn the history of science and technology and study the philosophy of science and technology.

Still, many question this problem itself. First, in terms of Chinese science and Western science, that Chinese culture and philosophy belong to different cultural patterns and philosophical forms from Western culture and philosophy, Chinese science and Western science naturally belong to different scientific forms. "Science should be a logical and self-consistent knowledge system composed of concepts, laws, theorems, formulas and principles", but strictly speaking, China never had such a "knowledge system". Then Needham mistakenly regarded China's summary of experience and description of phenomena as science. In fact, even at present, China and the West lack a consistent understanding of the concept of "science". Besides, the understanding of "science" is constantly developing and ever changing. Stephen F. Mason, a British science historian, once mentioned that "science as we know it today is a relatively late achievement in the general process of human civilization." Prior to recent history, there was little of a scientific tradition that differed from the philosopher tradition and from the artisan tradition as well. But science has a long history, dating back before Civilization."[2]This is also true in the history of science in China and the West: Mathematically, *Nine Chapters on Arithmetic* and *Elements of Geometry*; in physics, *Mojing* and *Physics*; in astronomy, the heliocentric theory, the celestial theory, and the nocturnal theory are combined with the heliocentric theory (proposed by Aristarchus in ancient Greece) and the geocentric theory; in medicine, the theory traditional Chinese medicine and the theory of Western medicine; ... Needham and others did not distinguish between Chinese science and Western science, leaving themselves wondering why modern "science" was not born in China. Second, when it comes to science and technology, with the significant development of science and technology today, the boundary between the two is gradually blurred, but

ISSN 2522-6398 Vol. 7, Issue 1: 182-186, DOI: 10.25236/FER.2024.070127

ancient societies, their boundaries were clear cut. The fundamental purpose of science is to understand nature, while the fundamental purpose of technology is to develop and transform nature, so technology needs to be based on science. According to Benedict's cultural relativism, different cultural patterns are generally not analogical, and science, as an important part of cultural patterns, is generally not analogical. When Needham talked about China's science and technology being more advanced than the West prior to the 16th century, he obviously confused the two concepts of science and technology, and misapplied the efficiency-wise standard of measuring technological advancement and backwardness to science. In fact, "Before the 16th century, China was ahead of the world only in technology and in the summary of social practical experience, but never ahead of the world in natural science, and China didn't even have no independent and systematic natural science theory in the Western sense."[3]Based on this explanation, the "Needham conundrum" widely accepted by the academia is Needham's expression in *Science and Society in the East and West* :1964. "Why was Chinese civilization so much more effective than Western civilization in acquiring natural knowledge and applying it to the practical needs of mankind during the period from the 1st century BC to the 15th century AD?" "Why did modern science arise only in Europe and not in Chinese (or Indian) civilization?" These two problems together constitute "Needham Problem", which is to be studied and discussed now. The problem is a two-sectioned statement, and the main problem again lies in the latter.

3. The reflection of "Needham Problem" on moral education

Theory should be linked with practice, and in turn practice should be combined with theory. There are many approaches to solving "Needham Problem" in practice, and the enlightenment it brings to people is also multidimensional. However, from the perspective of ethics, this paper holds that its main enlightenment to the current moral education is embodied in three aspects:

3.1 The high moral literacy of scientific and technological personnel and the good moral norms of society promote the development of science and technology

The role of morality in the development of science and technology is crucial and cannot afford to be ignored, because the regulating function of morality in social life is extensive. Good moral norms help create a good social environment for the development of society and are conducive to the formation of a good social order. Generally speaking, the progressive moral notion promotes the development of science and technology, while the decadent and backward moral cognition hinders the development of science and technology.

From the individual point of view, only scientific and technological personnel with good moral literacy can effectively ensure the effective implementation of scientific research activities. Moral literacy mainly refers to moral ideal, moral quality and moral responsibility. Only when scientists truly realize the value of science and technology and realize the value of science and technology to human society and personal development can they truly establish the noble ideal of science and technology as a lifelong pursuit. The moral character of scientists is cultivated in scientific research. The spirit of truth-seeking, innovation and selfless dedication is the key to the success of scientists, and it is also an indispensable factor in scientific research activities. If there is no such character, it will affect and hinder the activities of scientific research. From the perspective of social groups, the moral literacy of scientists is formed in their social life, and the general public attach importance to the value of science and technology in their value orientation, and adopt a positive attitude to support it, so that more and more people are willing to devote themselves to scientific and technological research. A good moral atmosphere is conducive to the formation and consolidation of lofty moral literacy of scientific and technological personnel; On the contrary, if the social value of science and technology is despised and the social status of scientific and technological personnel is belittled, it will have a negative impact on the moral literacy of scientific and technological personnel. Therefore, progressive social moral public opinion plays a vital role both in creating the atmosphere of respecting and loving science in the whole society and in encouraging people to conduct scientific research to promote the development of science and technology. Of course, the key to the formation of the moral literacy of scientific and technological personnel depends on the personal moral literacy, and in order to truly transform the moral principles of scientists into moral forces, scientists' moral consciousness needs to play its part. Since China entered into the socialist society, its science and technology has made remarkable achievements within just half a century, which is inseparable from the moral orientation that has been conducive to the development of science and technology since the founding of the People's Republic. *The Resolution of the Central Committee of the Communist Party of China on the Guidelines for the Construction of*

ISSN 2522-6398 Vol. 7, Issue 1: 182-186, DOI: 10.25236/FER.2024.070127

Socialist Spiritual Civilization points out that "love of science" is one of the main contents of socialist morality. The resolution also made clear that "science is increasingly becoming a revolutionary force to promote historical progress" and "in carrying out modernization, we should rely more consciously on science, carry forward the spirit of respecting science and pursuing knowledge, and strive to organize the popularization and improvement of education, science and culture nationwide in a down to earth way ". As can be seen from the above-mentioned, advanced socialist morality can open up the way and provide a public opinion guarantee for the development of science and technology.

3.2 Independent, innovative personality and noble scientific spirit enhance the development of science and technology

Innovative personality means "having the enterprising spirit of exploration and constantly updated attitude towards life, insisting on exploring their own inner spirit with a strong aspiration and urge to promote human progress, internalizing all these into a relatively stable personal psychological quality, sublimating into a personality trait, and making it a powerful driving force in pursuit of the improvement of innovation ability."[4]Throughout the history of mankind, those scientists who have made contributions to the development of science and technology all have lofty personality quality cultivation and independent innovation spirit. A person's mind and bearing hinges on his quality cultivation. Those who are narrow-minded and calculating have difficulty in innovating, because his outlook leads to his mindset being confined; The same is true of a person who often complains and is dissatisfied with the society, because he is always repeating his past, completely coping with new changes in the cliched way, and getting himself fixed on a rigid level. The height of innovation ability can be considered as the pinnacle of cultivating a creative personality.

The cultivating and shaping of innovative personality and quality cannot be separated from education. Traditional Chinese culture has a long history and has never been interrupted, which is closely related to China's emphasis on culture education and philosophy education. However, China's education system has ignored the cultivation of students' independent thinking and innovative exploring ability. Since ancient times, elections have been conducted in the form of examinations. In addition, the ancient imperial examination system was beyond rigid, mostly examining students' ability to recite and memorize, but lacking vitality and accuracy. Since modern times, we have gradually realized the drawbacks of "exam-oriented education", and have begun to explore and reform continuously. With the gradual reform and improvement of the education system, there has been a gradual transition from "exam-oriented education" to "quality-oriented education", that is, no longer only requiring students' academic performance, but also paying attention to the comprehensive development of students' morality, intelligence, physical education, beauty and labor, which is obviously a great leap ahead. However, we know that the reform of a policy or a system reform and its being put in place concretely can not be completed overnight, and it goes a long way to explore, research and apply them. Therefore, we should start from the concrete practice and further deepen and improve the reform of the education system. For example: make the classroom atmosphere as active as possible, encourage students to fully and freely communicate with each other, advocate equal dialogue and mutual learning between students and teachers; after school, students do more than just copy the rigid homework assigned by the teacher. Instead, they consciously develop their hands-on and practical ability, and give full play to their subjective initiative through real life experience, so that they gradually develop their autonomic learning and independent thinking habits; the standard to assess a student is no longer just the amount of knowledge, but is dependent on his personality quality cultivation, so a positive attitude and a strong will can not be lost at any time. As for the "administerization of universities" mentioned above, it is posing a threat to our higher education. When we are considering how to make academic research not subject to the control of administrative power and how to better promote academic research and innovation, "de-administerization" has aroused widespread concern and recognition. The government should not only guide and manage universities in appropriate ways, but also give universities as much autonomy in running schools as possible. The ultimate goal is to improve the quality of running schools and the level of academic research. In the internal management of colleges and universities, the power of teachers and management should be clearly specified, and mutual respect is preferable over the relationship between superiors and subordinates so as to ensure the democracy and science of decision making and promote colleges and universities to truly become institutions of education and academic research. In short, education is the key approach to cultivating innovative personality and shaping noble quality.With the reform of the education system further deepening, more qualified talents are cultivated for scientific development and technological progress, and their dependent personality is gradually transformed into independent and innovative personality. In this way innovation, that is, brave and unremitting exploration and

ISSN 2522-6398 Vol. 7, Issue 1: 182-186, DOI: 10.25236/FER.2024.070127

pursuit, is encouraged.

3.3 To promote the development of science and technology, we should lift the spirit of patriotism and treat traditional Chinese morality correctly

Science has no national boundaries, but scientists have their motherland. As a Chinese, we must first love our motherland and vigorously raise the spirit of patriotism, because patriotism is a kind of deep affection for the nation and the country, and is a national spirit with great cohesion and appeal. Besides, patriotism is expected to adjust the moral norms between individuals and the nation. To love the motherland requires us to have a strong sense of national dignity and pride, to care about the future and destiny of the motherland, to consciously establish a sense of responsibility as masters of the country, and to actively safeguard the stability of the motherland and national unity. It is believed that cultivating patriotic feelings can play an invisible role in boosting the development of science and technology and is of special significance.

We should also persist in dialectic analysis of the problem, correctly view and evaluate traditional Chinese ethics. We must be proud of the extensive and profound traditional culture of the Chinese nation, because it is our inexhaustible and precious treasure. Although we have mentioned some ideological and moral concepts that are unfavorable to the development of modern science and technology, we can by no means completely negate the traditional Chinese ethics. For example, the Confucian concept of "justice and benefit" emphasizes that the overall "justice" comes first, and the altruistic thought of "first establishing people when you want to establish yourself, and first actualizing others' ideal when you want to actualize yours" (The Analects of Confucius • Yongya) is undoubtedly conducive to the formation of an orderly social environment, and the orderly social order is a must to the social prosperity and scientific and technological development. As Mr. Luo Guojie put it, "Once a nation abandons or loses its own national traditions, or is conquered by the culture of another nation, then the survival of this nation is at stake." [5]

4. The enlightenment of "Needham Problem" to moral education in higher vocational colleges

There are many approaches to solving "Needham Problem", which render us inspiration in many aspects. Both theoretically and practically, it is undoubtedly an important research approach to discuss it primarily from the angle of ethics. Through the analysis of the personality of the scientific subject, we can see that there is a close relationship between morality and science and technology. When students in higher vocational colleges are receiving the ideological and moral education, they can not afford to lose their moral quality while mastering technical skills, and moral education training should be closely combined with the knowledge they have acquired and used, so that moral education can be fully implemented and become truly effective.

4.1 Focus on the cultivation of students' sense of responsibility

In the process of moral education, educators should be clearly aware of the concept of responsibility. Especially for students in higher vocational colleges, their professional ethics and professional loyalty will be particularly important to their future career development. Sticking to a post that may be just an ordinary one is an important test of the sense of responsibility. The educating of the sense of responsibility should be regarded as a system project, and should be carried out seriously. Additionally, it is necessary to establish the notion that responsibility is a basic value--seriously form requirements for themselves, improve their own ethics, and sublimate the responsibility and mission of educational staff. We should adhere to the student-oriented, student-centered strategy, and transform the corresponding responsibility into a regulation to control and arrange, so as to realize the real effectiveness of moral education. We should regard responsibility as a kind of action from the bottom of our heart, establish good professional ethics, meet the basic requirements of students, and promote the effectiveness of moral education through positive actions.

4.2 Pay attention to the fostering of students' moral values

In the process of moral and political education, educational attitude is more important than theoretical knowledge. Moral education in higher vocational colleges must be carried out in combination with the characteristics of students in higher vocational colleges, such as attaching moral education to students' practical skills, transforming theoretical teaching into practical guidance, and

ISSN 2522-6398 Vol. 7, Issue 1: 182-186, DOI: 10.25236/FER.2024.070127

experiencing the importance of rules and systems in practice and training. Therefore, at a certain level, analysis tells us moral education is also an education of legal concepts, and that the guidance of moral education constantly improves students' ideological awareness, so that they can effectively regulate their moral behavior through moral education and carry out activities in the scope of moral advocacy. At the same time, they also have the consciousness of using the weapon of moral public opinion to safeguard their due rights and interests.

4.3 Pay attention to giving full play to students' dominant role

When it comes to the key stage of establishing values, the students in higher vocational colleges have already possessed some comprehensive qualities in certain aspects, and also have had the ability to solve various problems. However, many students are still unwilling to communicate with educators, and still regard teachers as authorities in face of teachers, which, to some extent, reflects the inequality of teacher-student relationship. Therefore, when moral education is carried out, it is necessary to provide students with an equal and open learning atmosphere, build an equal relationship between educators and educatees, truly narrow the distance between teachers and students, and promote the smooth development of moral education.

4.4 Pay attention to the methods and means of moral education

Teachers in higher vocational colleges should make students experience and perceive the ideological and moral theories in an indirect and infiltrating way, and enhance their adaptability to society through the gradual buildup of knowledge structure. We should open up the second classroom for students and make it a new camp of moral education with the help of widespread Internet access. In so doing, teachers can make full use of the popularity of students' using the Internet to build them a moral education platform, where they can share the thoughts that they otherwise cannot express in the presence of teachers. And at the same time, teachers need to timely elicit their questions and help them to overcome the difficulties they're faced with and solve the problems they encounter.

5. Conclusions

Re-examine the questions and reflections raised by "Needham Problem" from the perspective of ethics, analyze the relationship between morality and science and technology in terms of ethics, and remind us that special attention should be paid to the cultivation of the subject's personality in the process of moral education. Specifically speaking, the moral education in higher vocational colleges should pay special attention to the effective integration of moral education into the training of technical skills, thereby achieving the goal of cultivating high-quality and literacy-rich skilled personnel.

Acknowledgment

This paper is a phased research result of the general project of Ideological and political special project of Chongqing Industry Polytechnic College in 2023, "*Thinking about the current implementation path of moral education in Higher vocational Colleges from the perspective of 'Needham Problem*'" (Project Number: 2023GZYSZY-06).

References

[1] Needham. The History of Science and Technology in China (Vol. 1) [M].Beijing: Science Press, 1990.
[2] Stephen F. Mason.History of Natural Science [M].Shanghai: Shanghai Translation Publishing House, 1980.
[3] Qian Zhaohua.A New Interpretation of the Needham Problem [J].Research in Dialectics of Nature, 1998(3):55-56.
[4] Tang Dianqiang.Course of Innovation Ability [M].Shijiazhuang: Hebei Science and Technology Press, 2005.
[5] Luo Guojie. How should We treat Tradition [J].Morality and Civilization, 1998, 1(8):36.