

Cultivating the Craftsman Spirit in Higher Vocational Engineering Students under the New Engineering Education Framework

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Abstract: *In response to the Ministry of Education's New Engineering Education (NEE) initiative, this study examines how higher vocational institutions can effectively cultivate the craftsman spirit among science and engineering students by leveraging their practice-oriented curricula, industry partnerships, and skill-based training models. It contends that systematically embedding professional ethics, meticulousness, and continuous self-improvement into both theoretical instruction and hands-on practice is essential. This cultivation process is expected to enhance vocational education quality and underpin China's socio-economic stability and innovation-driven development.*

Keywords: New Engineering Education, Craftsman spirit, Higher vocational education, Student cultivation, Engineering ethics.

1. Introduction

Facing a new round of industrial and technological revolution, Chinese government departments have successively introduced a number of national strategies. After the economy has entered a new historical stage, the education cause must conform to the trend of the times. The new engineering construction is a new historical journey. Since "craftsman spirit" was put forward in the "Government Work Report", it has become a hot topic in the domestic manufacturing industry. At present, the research on this spirit mostly stays in the formation reasons, specific manifestations and inheritance, etc. Secondly, it is to integrate vocational education and "craftsman spirit". At present, there are few effective studies on promoting it through ideological and political education. The research in this field in China is in its infancy, the subject setting lacks clarity, and there is no systematic theoretical system.

2. Cultivation of Craftsman Spirit among Science and Engineering Higher Vocational Students

Since China's reform and opening up has been deeply implemented, in order to pursue high-speed economic growth, the emphasis on "craftsman spirit" has been ignored for some time. Under the new round of industrial revolution, when we put forward this spirit, it is necessary to conduct in-depth research and discussion on it in the academic community and rediscover the value and connotation behind it.

2.1 Main Characteristics of Science and Engineering Higher Vocational Students

2.1.1 The status of students

To realize the great rejuvenation of the Chinese nation, not only innovation in technology is needed, but also the cultivation of culture and belief should be emphasized. As important builders of society, students need to achieve technological innovation and rely on their strength to achieve innovative development. The increasingly complex social

situation makes us realize that society values more whether students have the spirit of dedication, integrity, perseverance, the courage to face difficulties and perseverance. The cultivation of students' professional ethics is particularly important, so as to avoid the imbalance between theoretical knowledge and value concepts in their minds.

2.1.2 Rigorous thinking but lacking in innovation awareness

The rapid development of technology stems from the rigorous thinking ability of talents. After systematic demonstration, the final results are formed. The talent cultivation plan of higher vocational schools generally meets this requirement. While cultivating students' rigorous thinking to the greatest extent, it actively guides them to make reasonable inferences based on various experimental data and draw the final conclusions. However, this education system also has certain limitations, which are likely to create an established thinking mode in students' minds and greatly limit the cultivation of their innovation ability.

2.2 Specific Connotations of Cultivating the Craftsman Spirit of Higher Vocational Students in Science and Engineering

2.2.1 The spirit of respecting teachers and the Tao

Since ancient times, the idea of "once a teacher, always a father" has been the main principle of the master-apprentice relationship. For contemporary students, cultivating the craftsman spirit includes the important idea of "respecting teachers and attaching importance to education". Whether a student can accurately master the theoretical content depends crucially on his degree of dedication to the course. As we all know, only by respecting teachers and studying hard can one have the opportunity to master skills. In addition, during the teaching process, teachers should also take into account the cultivation of everyone's ideological morality and truly reflect the value of education.

2.2.2 A rigorous attitude towards learning

The basic value of the craftsman spirit is mainly reflected in being rigorous and meticulous. Workers need to be dedicated, rigorous, and maintain a highly responsible working attitude during the process of manufacturing products. As a student, in daily study and practical training, one should also possess the above qualities, be rigorous and realistic in every assignment and every experimental training, and complete them wholeheartedly, striving for perfection. With a serious attitude and a focused behavior, taking "details determine success or failure" as the basic principle, grasping the essence of the craftsman spirit. In today's era, we should have the ability to resist temptation and endure loneliness, conduct in-depth research, and make the pursuit of perfection a daily habit.

2.2.3 A firm belief

The internal belief education of the craftsman spirit is not only about pursuing an extreme professional attitude but also an unswerving and firm belief. When practicing and working, maintain a belief in work. In scientific research, correct the attitude and firmly believe in the activities one is engaged in. This is one of the important qualities that students in the new era should possess. As the future successors of socialism, we should strengthen the ideological education of students, guide everyone to understand and recognize Marxist theory, and take it as their life pursuit.

2.3 Importance of Cultivating the Craftsman Spirit among Science and Engineering Higher Vocational Students in the New Engineering Context

2.3.1 Steadily promoting the development of intelligent manufacturing

After China's economic development entered the new normal, the traditional model no longer meets the development needs of the era, and the manufacturing industry urgently needs to transform and upgrade. As an important spiritual force for the country to transform and upgrade towards a manufacturing powerhouse, cultivating this spirit among students can ensure the effective implementation of the innovation-driven strategy. Innovation, as a vane for a country's long-term prosperity in the future, has become one of the contents of competition among countries in the context of the new round of industrial revolution. The main feature of the craftsman spirit is to discover regular features and learn to make reasonable use of them to achieve new development on the original basis.

2.3.2 Inheriting excellent traditional culture

Since ancient times in China, there have been many master craftsmen, and the craftsman spirit is a precious wealth formed in the development process of the Chinese nation. Cultivating this spirit among higher vocational students can not only strengthen their understanding of outstanding figures but also set good examples for them. The basis for the development and innovation of culture is to inherit excellent traditions. In today's society, by vigorously promoting and cultivating the craftsman spirit, the Chinese people can strengthen their cultural confidence, enhance their sense of identity with national culture, and achieve cultural prosperity and development.

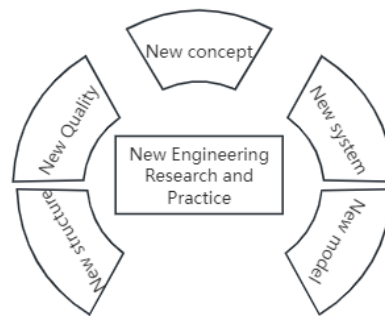


Figure 1: Main Contents of New Engineering

2.3.3 Effectively promoting the development of higher vocational teaching

To further explore the path of ideological and political education in schools, highlight the advancement and purpose of ideological and political education, and make the ideological and political classroom profound and vivid. Advocate students to develop a professional spirit of loving their posts, being loyal and dedicated, and constantly pursuing excellence and innovation, and become qualified high-quality technical and skilled talents. As practitioners of this spirit, in actual education, taking serving society as the core value orientation can encourage everyone to bravely shoulder their social responsibilities.

3. Current Situation and Causes of the Cultivation of the Craftsman Spirit among Science and Engineering Higher Vocational Students in the New Engineering Context

3.1 Students Lack Sufficient Attention to the Craftsman Spirit

Among the things students can access, such as newspapers, TV programs, and online videos, people pay too much attention to entertainment programs and neglect programs like "Great Craftsmen of China". While students focus on political events, they also place their emphasis on entertainment programs, thus ignoring the craftsmen who silently contribute to the country's development.

3.2 Lack of Learning Initiative

Some students lack the initiative to study and have no clear goals. After leaving school education and parental supervision, students are prone to a relaxed mindset and lack good self-discipline habits. In addition, some students lose their initiative to study because they lack an understanding of their chosen majors. Most people think that the so-called craftsmanship spirit is the value choice of workers and has little to do with them, so they cannot strongly identify with it and are not willing to take the initiative to study on their own.

3.3 Lack of Humanistic Quality

For a long time, many science and engineering higher vocational colleges have only emphasized the teaching of theoretical knowledge and practical skills, neglecting the cultivation of humanistic quality. At present, the theoretical framework of professional knowledge in each college is relatively complete, but the humanistic knowledge is

seriously lacking. This talent cultivation model is not suitable for the long-term development of higher vocational college students. In addition, the moral character of some teachers needs to be improved, which also has an adverse impact on the cultivation of the craftsmanship spirit among students.

3.4 Incomplete National Policies

As we all know, national policies have an important impact on social development. Reasonable policies should be formulated to ensure the inheritance and development of the craftsmanship spirit, so as to achieve the upgrading transformation of the manufacturing industry. At present, this spirit has been written into the government work report for several consecutive years and has attracted strong attention. However, because it has been officially proposed for a short time, the relevant laws and regulations need to be improved. Some schools stay on the surface and do not carry out in-depth activities. The country needs to introduce a series of policies to provide teaching guidance for many colleges.

3.5 Imperfect Teaching System in Higher Vocational Colleges

At present, the curriculum settings of some schools are not reasonable enough, and there is room for further improvement in the education mode. The talent cultivation goals need to be further implemented. Combining the craftsmanship spirit with courses only through forms such as forums and lectures is too single and cannot be carried out systematically. Teachers' explanations of this spirit are mostly in ideological and political classes, but overall, this teaching method is too narrow and restricts students' ability to think divergently. In addition, theoretical teaching occupies a dominant position, with outdated content and serious detachment from practice, resulting in students being not meticulous and rigorous enough in dealing with things.

Conducting learning assessments for students is an important step in promoting the development and progress of each individual. However, some schools solely rely on scores for evaluation, resulting in a lack of enthusiasm among teachers and students for exploring new knowledge. To cultivate outstanding talents, an excellent teaching team is essential. Teachers are the main body of ideological and political teaching, assuming the role of guides. They have the responsibility and obligation to extend the spirit of craftsmanship into the classroom. However, some teachers, in order to conduct experimental training projects and enhance their personal titles, do not pay sufficient attention to teaching, seriously hindering students' understanding of the spirit of craftsmanship.

3.6 Ways to Cultivate the Spirit of Craftsmanship among Higher Vocational Students in Science and Engineering under the Background of Emerging Engineering Education

3.6.1 Strengthening Policy Guidance at the National Level

Firstly, it is necessary to take the core socialist values as the foundation and practice the spirit of craftsmanship. Considering the current economic development situation, to

build a modern country with strong economic strength, in the new round of industrial revolution, the spirit of pursuing excellence should be used as a guide and a powerful guarantee for enhancing economic strength. By widely publicizing core values such as loving one's job and being dedicated, it helps people improve their personal moral qualities and form a good atmosphere of loving labor in society. In addition, the existing employment system should be improved. The government departments should be strengthened in the market economic system through various means, and be scientific and reasonable in the selection and appointment of talents, improve the market environment, and effectively enhance the important status of craftsmen in society. At the same time, a reward and punishment system should be established, laws should be improved, commendation activities should be carried out for outstanding collectives and individuals, the environment should be purified, the structure should be optimized, the income of various talents should be increased, and social fairness should be improved.

3.6.2 Improving the Teaching Curriculum Structure

To effectively cultivate the spirit of craftsmanship, it is necessary to improve the existing curriculum system, arouse students' learning interests, and enable them to truly understand the spirit of craftsmanship. Incorporate this spirit into the talent cultivation plan, formulate teaching plans, set up assessment links, and make reasonable curriculum arrangements according to the actual situation to prevent it from becoming a "useless course" [10]. Change the teaching mode, update concepts, pay attention to teaching students in accordance with their aptitudes, and make full use of modern Internet technology to enable everyone to truly experience relevant knowledge. Abandon the evaluation system that mainly relies on written tests, adopt a combination of multiple methods, establish a scientific evaluation system, and strengthen comprehensive qualities.

3.6.3 Fostering a Sense of Patriotism and National Commitment

Accurately understanding China's basic national conditions is the main basis for developing the economy and promoting social progress. China occupies an important position on the world stage. After the 2008 financial crisis broke out, countries once again recognized the importance of manufacturing for a country and introduced new policies one after another. China launched the great strategy of "Made in China 2025" as shown in Figure 2. In order to stand out in the fierce competition, it is necessary to firmly occupy the leading position in the revolution, and it has become crucial to cultivate the craftsmanship spirit. We must objectively and calmly recognize the significance of the return of this spirit for the overall development of the manufacturing industry. Foster a sense of patriotism and dedication, realize one's own responsibilities, and practice the craftsmanship spirit in practice.

3.6.4 Enhance students' professional ethics

Strengthening professional ethics education is not only in line with the needs of economic and social development but also one of the contents of the reform of higher vocational

education. Deeply realize that people from all walks of life play an important role in their respective positions, cultivate new professional ethics concepts for higher vocational students, strengthen their professional identity and sense of belonging, and lay a foundation for future career choices.

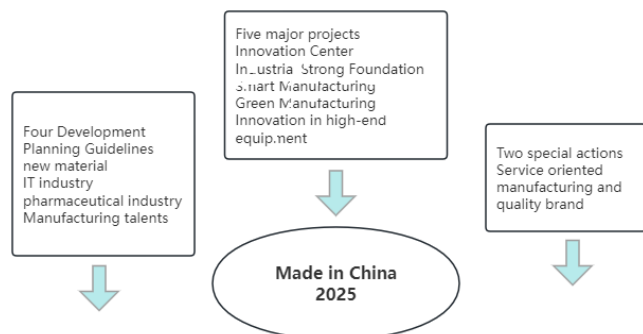


Figure 2: Main content of "Made in China 2025"

3.6.5 Innovative ideas to expand the spirit of craftsmanship

In the new era of mass entrepreneurship and innovation, new requirements are put forward for students' innovative concepts. The traditional teaching method is too restrictive, and the learning mode is formulaic, making it difficult for everyone to have the innovative awareness to solve problems. It is necessary to improve students' subjective initiative, stimulate curiosity, encourage everyone to be good at exploring and discovering problems, and enhance their independent thinking ability.

4. Conclusion

Currently, the academic research on the craftsmanship spirit is in its initial stage and there is no unified understanding; higher vocational students majoring in science and engineering face some problems during the cultivation process and urgent solutions are needed; there is room for improvement in the formulation of national policies and regulations; there are some teaching drawbacks in schools. All in all, this is a long-term cultivation process. We need to start from the perspective of the education subject, under the incentive and guidance of policies, improve the current teaching structure, purify the social environment, strengthen teachers' professional skills, recognize the craftsmanship spirit in thought, and practice the craftsmanship spirit in practice.

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