

Interpretation and Educational Implication from the Endogenous Power of Chinese Culture to the Spirit of Scientists

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Abstract. The spirit of scientists is essentially a spiritual product with Chinese characteristics, which is formed under the guarantee of socialist system. By revealing the influence of different cultures on the formation of the spirit of science, we point out that the mechanism of the driving force of the spirit of science is not confined to the pursuit of free humanity in the western world, but also exists in the Chinese culture, which is clearly proved by the spirit of scientists. The research shows that the endogenous force of the Chinese culture in the development of science is explained, and the role of the Chinese culture with development of science is interpreted. Finally, based on the far-reaching connotation of the spirit of scientists, all new era spirits of scientists make science education more interesting, more temperature and goodwill.

Keywords: Scientism; Patriotism; Chinese culture; Science education

1. Introduction

Scientific achievements cannot be separated from spiritual support, and the spirit of scientists is a valuable spiritual wealth accumulated by scientific and technological workers in long-term scientific practice [1]. The spirit of scientists is not only the inner combination of Chinese patriotism and the spirit of science, but also the corroboration and elaboration of the endogenous power of Chinese culture. For a long time, science as a cultural product of Western culture has provoked the bottom of Chinese culture. In the context of science increasingly constructing the world picture, Western culture and Western-style thinking have gradually been equated with the birth of the spirit of science, and Chinese culture has been slightly weaker in the logic of science [2]. The spirit of scientists explicitly mentioned by President *Xi Jinping* at the symposium with scientists and workers provides a point of fit and breakthrough for the integration of the spirit of science into the spirit of the Chinese nation, and at the same time, the spirit of scientists, as a valuable spiritual wealth of the Chinese nation, proves that the spirit of science is adaptable and compatible in Chinese culture. "People without spirit will not stand, the country without spirit will not be strong." In the context of Huawei's "chip incident" and a series of key technology "neck", the spirit of scientists is a characteristic interpretation of the spirit of science in contemporary China, which will be China's spiritual capital in the changing world and the bottom of the face of foreign scientific and technological provocations. The spirit of scientists is a characteristic interpretation of the spirit of science in contemporary China.

2. Essence of the Scientist's Spirit

Patriotic sentiment and scientific spirit meet in socialism. Science has no borders, and those who work in science and technology have their own homelands. Anyone is "not an abstraction inherent in a single person", and thus a scientist cannot be abstracted into a scientific worker with only the spirit of science [3-5]. Since the founding of New China, Chinese scientists have been tempered by history for a long time, thus forming the spirit of scientists with our national characteristics. Since the emergence of the scientists' group, it has the quality of helping the people through the world, therefore, the scientists' spirit is bound to emphasise the social attributes of science more than the spirit of science [6-8]. The connotation of the epochal value of the spirit of scientists is a concrete condensation and embodiment of the spirit of the times since the founding of New China, and "the

initial spirit of serving the country with science, the determination to innovate, and the perseverance in seeking are the kernel of the spirit of Chinese scientists". Under the guarantee of China's socialist system, the spirit of scientists, with the spirit of science as its matrix, meets and combines with the patriotic sentiment of the Chinese nation, and comes into being.

2.1 Sublimation of the Spiritual Matrix of Science. The development of science in China is different from the logic of the development of science in Western culture, which is related to the historical background of the entry of science into our culture. In China's modern history, with the western colonial expansion and invasion, science entered the Chinese people's vision with the mission of saving the dead and preserving the seed, and attracted the attention of the Chinese people with its powerful military force. In the attention and pursuit of western science and technology, scientific spirit as the core quality of scientific research came into people's thinking. People are looking forward to an in-depth analysis of the spirit of science, so as to find the soil in which the spirit of science can be cultivated in Chinese culture [9-10].

As early as January 1916, *Ren Hongjun* of the Chinese Science Society published an article entitled "The Spirit of Science", in which he proposed, "What is the spirit of science? Seeking the truth is already," and explained its elements as "revering truth" and "valuing certainty". In 1922, *Liang Qichao* interpreted the spirit of science as "a method that can teach people to seek systematic true knowledge". Subsequently, the scientist *Zhu Kezhen* elaborated the spirit of science in greater detail. Firstly, he emphasised that science, as an imported product, should take into account the cultural characteristics of its own occurrence; secondly, he pointed out that it is the spirit of science that nurtures the occurrence of science; and lastly, he explained that the connotation of the spirit of science should include: "(1) Do not follow blindly, do not agree with each other, and always rely on reason. If one meets a situation of adversity, one will be indomitable, not fearing the strongest defence, only asking for right and wrong, not counting the advantages and disadvantages. (2) To be open-minded, not arbitrary, not brutal. (3) Concentration and consistency, seeking truth from facts, not moaning without disease, and rigour and neatness." After the founding of New China, with the development of science and technology and philosophy of science, the study of the connotation of the spirit of science has become more detailed. *Wu Guosheng* analyses the ideological and cultural soil that nurtures modern science through the occurrence and development of science in human history, and regards ancient Greece's reverence for rationality and freedom of personality as the ideological and cultural soil for the occurrence of modern science, and such a soil provides precisely the free scientific spirit. Li finally gives a more comprehensive definition of the content of the spirit of science, and he believes that the spirit of science is a whole, which directly embodies the essential characteristics of science and gradually unfolds into an orderly hierarchical structure.

Although the meaning of the spirit of science has changed with the depth of research and the development of science, the function of the spirit of science has never been questioned [10-11]. It is precisely because of its functionality that the spirit of science has attracted the attention of scientists, educators and others, and that the spirit of science has from the very beginning been a trigger that points directly to the occurrence of scientific behaviour and thus to the birth of scientific results. The spirit of science not only plays a key role as a spiritual force in the scientists' exploration of the truth, but also promotes the scientists' scientific self-awareness and provides the most basic guarantee for the scientists' exploration and achievement in the field of science. Because the spirit of science ensures the seriousness and scientificity of scientific activities; coordinates the way of behaviour and social relations of members of the scientific commonality; and strengthens the autonomy of science, the cultivation of the spirit of science is the goal that science education is constantly pursuing. However, the spirit of science always revolves around the occurrence and development of science and the core of the spirit of science are only to contribute to the achievements of science. People working in science are abstracted and homogenised in the formation of the spirit of science as people engaged in scientific research, without pointing out the cultural identity of such people. The scientist as a concrete person has his own system of cultural values, and the formation of the scientist's spirit is the sublimation of the spirit of science, which points to the material nature, to the cultural nature of the person. The spirit of science provides the matrix for the formation of the spirit of scientists, and the

spirit of scientists provides the direction for the sublimation of the spirit of science: without the spirit of science, the spirit of scientists becomes suspended in the air, empty patriotism; and without the spirit of scientists, the spirit of science stays at the level of material science and wanders without sublimation.

2.2 Call to Patriotism. Science without borders, but scientists have their own motherland, patriotism is everyone's duty and responsibility [12-13], "is the deepest and most enduring emotions in the world, is the source of a person's virtue, the basis of merit". Patriotism is not only a kind of psychological feeling for the motherland, but also a kind of value care and bearing bosom. In other words, the care for the country's heart is not only an individual feeling, but an emotional identity based on the knowledge of the country's history, geography and so on. Emotional identity will awaken the individual's will tendency, thus triggering the individual to invest their own life energy, to individualise the practical action to express the realisation of emotional expectations. Patriotism has awakened the deep love of scientists for their motherland, and scientists' hearts are directed to the country and consciously link their life choices with the destiny and needs of the country. As a result, the spirit of science meets with the patriotism of the Chinese nation, composing an epic of the scientific and technological rise of the Chinese nation, and casting the unique spirit of scientists of the new China.

For a long time, generation after generation of scientists, with deep patriotism, have made significant contributions to the motherland and the people by virtue of their superb academic attainments and broad scientific vision [14-15]. They have used their own practical actions to illustrate the "ardent patriotism, fist red heart". In recent times, the Chinese nation has experienced internal and external problems, foreign blockades and other crises, and at every crisis, Chinese scientists around the world have done their best to help the motherland to overcome the difficulties and return to the motherland to participate in the construction of the country. The firm belief of scientists not only contains the persistent belief in scientific exploration, but also contains strong patriotic feelings. At the beginning of the founding of the country, a large number of scientists of the older generation, such as *Li Siguang*, *Qian Xuesen*, *Qian Sanqiang*, *Deng Jiaxian*, etc., gave up the favourable treatment in the United States and other developed countries to return to the motherland, and there are a large number of outstanding scientists who have grown up after the founding of the new China, such as *Chen Jingrun* and *Nan Rendong*, who have all closely linked their ideals of their own life with the destiny of the country and the needs of the country. Even though *Qian Xuesen* and *Zhao Zhongyao* encountered inhumane treatment on their way back to China, they still had their hearts set on the motherland and were dedicated to the country. Finally, with their own persistence and the efforts of our government, they returned to their motherland. It is the patriotism and the spirit of science together, for scientists to provide wickerwork courage, inspired a large number of scientists to go back to the motherland after many difficulties. Patriotism sharpened them to move forward, research, and become the core of their firm beliefs. "To carry forward the spirit of patriotism, patriotism education must be made an eternal theme", and the combination of scientific spirit and patriotism is undoubtedly a new phenomenon of the "Spirit of China".

2.3 Guarantees of the Socialist System. It has taken our scientists more than 100 years to go through the 1,000-year history of the development of Western science and technology, and the support of the Party and the people and the guarantee of the socialist system are behind such remarkable achievements. The leadership of the Party and the advantages of the system are the important guarantee, the social stability and the support of the people are the strong backing, and the firm belief and selfless dedication of the scientists are the key, which have jointly created the spirit of scientists with Chinese characteristics in the history of progress. In the 1950s and 1960s, the Communist Party of China (CPC) put forward the slogan of "marching towards science" and formulated and implemented the strategy of "focusing on development and catching up" to catch up in science and technology, stressing that "we must catch up with each other and strive to expand and improve our country's science and technology as rapidly as possible". It was emphasised that "we must catch up and strive to expand and improve our scientific and cultural strength as rapidly as possible, so that we can catch up with the world's advanced level in a not-too-long period of time".

To this end, the state successively formulated a visionary plan for scientific and technological development, the 1956-1967 Visionary Plan for Scientific and Technological Development, to clarify the direction of scientific and technological development and to deploy scientific research tasks; scientists took an active part in the formulation of the Twelve-Year Scientific and Technological Plan, and carried out a climax of scientific and technological research based on the virtually blank industrial and technological base of the new China. Despite the twists and turns in exploring the road to socialist construction, the basic scientific research tasks of the Twelve-Year Plan were completed five years ahead of schedule, and major scientific and technological achievements such as the "Two Bombs and One Star" and the electronic computer were made. For the impoverished new China, it was the correct leadership of the Party and the advantages of the socialist system in concentrating its strengths on major issues that enabled it to integrate and optimise the allocation of resources.

3. Chinese Culture Gathers Internal Forces to Trigger Scientific Spirit in Turn

The inward-looking culture's moulding of human nature made it the fate of China's existence to miss the occurrence of modern science. If the inward-looking Chinese culture is the root of the Chinese people's fate of missing out on science, then the Chinese culture will also trigger the inevitable scientific and technological development of the Chinese nation through the casting of patriotism. Although modern science in the western culture has experienced a thousand years of precipitation, brewing, but, as the key factors and representatives of advanced productive forces into our culture, the rapid development of a strong culture. Science has been "deified" from the very beginning of its entry into our culture, and has become the key to solving social problems in the minds of the people. For Western science, the pursuit of a free personality is the original motivation for people to explore the mysteries of the material world. Whether in the occurrence of science or the formation of scientific spirit, the free personality is the driving mechanism that always works, rather than an element or content within the scientific structure. In other words, in order to promote the development of science and the formation of the spirit of science in China, we need to find an appropriate driving mechanism in our culture.

Therefore, if science education in China is to promote the formation of the spirit of science, it is necessary to combine the original impetus of this spirit of science deeply with the motivational mechanism in Chinese culture. The achievements of scientific research since the founding of New China and the spirit of scientists demonstrated by scientists have shown that Chinese culture is capable of initiating the occurrence of science and giving rise to the formation of scientific spirit. Both the collective culture formed by the cultural structure of "benevolence and courtesy" and the patriotism that is centrally demonstrated will serve as powerful arguments. The culture of "benevolence and courtesy" can be not only inward but also outward. In the new era, people are "for the collective" rather than "catering to the collective", and the updating and innovation of knowledge is not an affront to the culture of "benevolence and propriety", nor is it a way to turn the "benevolence and propriety" culture into an "honour". The renewal and innovation of knowledge is not an affront to the culture of "benevolence and propriety", nor is it a generalisation of "benevolence and propriety" into a hierarchy. The true meaning of collectivism is not to limit the development of the individual, and such an ideological shackle puts a stigma on the relationship between collectivism and "benevolence and propriety" that prevents science from taking place. In Chinese culture, the nation is the larger collective, and in this we have maintained only intermittent enthusiasm. Patriotism, the core of the Chinese national spirit, has been a powerful force since ancient times, and in the context of the new era, it has been expressed and interpreted in deeper and more varied ways. The expression of patriotism has changed from explicit to implicit in a deeper and deeper way. Chinese children have such cultural genes in their bones, but they are often neglected. Especially since modern times, the impact of Western culture is in a hurry to lose the position of Chinese culture. Chinese culture has been in modern science in front of the powerlessness of Chinese culture in the scientific world gradually declined. The intrinsic motivation of Chinese culture towards science, which is elaborated by the spirit of scientists, is the key to regaining cultural confidence in the world of science. Emphasis on cultural confidence is not a kind of night and day arrogance, but a search for the roots of Chinese

children in the changing landscape of the contemporary world, and a deep rooting in them. Promoting the development of science based on local culture is an important manifestation of cultural self-confidence, rather than casually derogating one's own culture with the achievements of foreign cultures. There is no doubt that the excellent Chinese culture has such strength and commitment.

4. Educational Implications of the Spirit of Scientists

4.1 The Spirit of Scientists Makes Science Education more Interesting. The connotation of the spirit of science is a universal commonality among scientists, and the spirit of scientists is based on the commonality of the spirit of science into the individual's historicity, the individual experience of scientists and the spirit of science with each other to elaborate, so as to integrate the spirit of scientists and patriotism. Scientists are real people who carry the spirit of scientists. A "real person" is a person who engages in practical activities. The way of human existence - practice - determines that scientists and their spiritual qualities can be understood only from the practical activities and historical development of scientists. Scientist's spirituality is embedded in the world of experience of every scientist and is closely connected with the scientist's historicity. In order to understand the spirit of scientists, it is necessary to return to the historical and cultural background of scientists, and to perceive their spirit in the context in which they are located. In returning to the process of history and culture, science education naturally returns to the history and culture of science. It is in the historical culture that the spirit of scientists is concrete and palpable, and it is the spiritual nutrients that can be absorbed.

4.2 Spirit of Scientists Makes Science Education More Temperate. The spirit of Chinese scientists is the modernisation, Chineseisation and personification of the spirit of science. The integration of the spirit of scientists into science education, while adding fun and dissolving boredom to children's science education, reveals a warm image of scientists in the story. The multi-dimensional presentation of the image of scientists in science education will warm up the original cold material relationship. Whether it is the "father of Chinese space" *Qian Xuesen* who gave up the favourable conditions in the United States for his country and returned to his motherland, or *Sun Jiadong* who was moved to tears at the completion of the Beidou-3 satellite navigation system, scientists will be fully embodied as a complete person. They will suffer frustration and hardship for their country, and shed tears of excitement for their country. All the emotional outpouring makes science education more full of human warmth. Compared with the abstract and philosophical nature of the spirit of science, the spirit of scientists is more concrete and vivid, and is also suitable for children's level of understanding. Through this "Chinese spirit" to melt the children's hearts, so that in the process of science education to enhance the children's feelings of patriotism, so that the scientists' role model power to pass to the children more energy to enhance the children's sense of mission and sense of responsibility.

4.3 Spirit of Scientists Makes Science Education more Benevolent. How science works in people's lives will depend on the conscience that scientists possess. The spirit of scientists will float in the void of the spirit of science planted in the soil of Chinese culture, thus providing a spiritual and emotional belonging for scientists with the spirit of science. By integrating the scientists' spirit, which carries the genes of "harmony" and "goodness" of Chinese culture, into science education, we not only feel the power of Chinese culture and build up cultural self-confidence, but also make science education itself devoted to the value orientation of "goodness" of human science. The science education itself is committed to the value orientation of "goodness" in human science.

5. Summary

The spirit of scientists is a characteristic combination of patriotism and scientific spirit in China, enriching and developing a new chapter of "Chinese spirit", while the endogenous power of Chinese culture revealed by the spirit of scientists is the core and essence of China's soft and hard power. Thus, through the absorption of the spirit of scientists in the new era of science education, the scientists'

comprehensive human glory, patriotism and the power of Chinese culture are integrated into the cultivation of the spirit of science.

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