

Comment on the Relationship between Scientific Education and Artistic Education

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Abstract: Through the analysis of dialectical relationship between scientific education and artistic education, this essay expounds that scientific education and artistic education is a dialectical unity and the necessity of unifying them. Abundant artistic imagination permeates in science, at the same time art contains a lot of rational, logical thoughts of science. Scientific education and artistic education is unified through imagine education, emotion education, value education and freedom education.

Keywords: scientific education; artistic education; dialectics; unity; analysis; idea

It seems that scientific education and artistic education are two irrelative educational systems. However, there are great profound relationships between them, which are called two sides of a coin. The great educator Mr. Cai Yuan-pei pointed out: "Each moral person in the world depends on art and science, as a carriage has two wheels and a bird has two wings." Therefore, it's very hard to find a borderline between art and science. The discussion between scientific education and artistic education not only helps deepen the cognition of science and art, but accelerates the unity of them as well to reach the comprehensive development of educatees.

I. The Dialectical Relationship between Scientific Education and Artistic Education

The aim of scientific education is to teach systematic knowledge and develop students' ability of rational thinking, while the aim of artistic education is to develop and stimulate students' thinking in images, to promote the comprehensive development of personality. Therefore, scientific education and artis-

tic education are closely associated in human's development and creative activities, through which we can find they are permeating and complementing each other. Einstein said that he could see a harmonious ordered world abiding the law of nature in the works of music. What's more, Copernicus was a master of landscape and Nobel was a poet too. Leonardo da Vinci pointed out that painting is a subject of science and sculpture is a branch of art characterized with mathematics. So he is both a great master of art and a giant of science. His works are the models of unity between science and art. That is to say, science needs the imagination of art and art needs the rational thinking of science. Art can give scientists more imagination and creativity, while science can give artists redoubled might.

Science and art is a different but relative dialectical unity. Logical thinking is the main method for science, while thinking in images is the main method for art. The famous scientist Qian Xue-sen in China discovered that science originates from the thinking in images and ends at logical thinking. To the whole

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process of scientific creation, the way of thinking for science is not purely rational. On the contrary, it needs the irrational way of thinking to make the necessary complement. Mathematics' creation is a model. Mathematics is the most abstract, strict and precise subject. What's more, the strictness and precision of scientific subjects all benefit from mathematics. However, mathematics often originates from dispersing thinking and then analyses it with the strict logic, namely thinking of convergence. That is to say, even if the most strict and precise mathematics creations need the dispersing thinking, this is based on illogical intuition and imagination. So, for the specific nature science, it goes without saying. We can see that it's impossible to finish scientific creation only with logical thinking and rules. Besides, scientific creation needs intuition, inspiration, imagination and thinking in images. On the other hand, compared to nature science's rationality, the way of thinking for art is irrational in essence. The so-called irrationality mainly refers to its emotion and imagination, which show the most obvious irrationality of art than others. Especially for the completed works of art, irrationality is manifested at least from the intuitional, emotional and imaginable forms. However, the way of thinking for art is not so irrational sometimes in the whole process of art creation. It often needs the rational thinking as the complement. Leonardo da Vinci's art is regarded as the art of scientist, or his science is the one of an artist. Besides, it's said that his greatest contributions are his method and attitude. His life is his masterpiece. We can see that his achievements demonstrate that science and art are two opposing and closely relative ways of thinking. In addition, we can prove this from the scientific naturalism's works of Renaissance and other works of modernism. If the art of scientific naturalism fully exerts the scientific observation and the skills of analysis, the art of modernism bravely uses the abstractness of modern science for references. As Arnheim said, scientific methods are the ones that penetrate the artificial phenomena and hold the essence more directly. This direct grasp of the complete essence is the aim of those extraordinary painters and sculptors of modernism,

who try to gain through abstractness.

Therefore, the rational thinking as an important complement for irrational thinking is indispensable for the creation activities of art. Scientific and artistic thinking is a dialectical unity because scientific thinking comes from images to abstractness, while artistic thinking from abstractness to images. Scientists begin from brave imagination and association, take meticulous confirmation, grasp the essence of the subjects and complete the process from art to science. On the other hand, after getting the cognition of subjects, artists endow them full emotion, abundant imagination and perfect forms and complete the process from science to art. So science needs abundant imagination and art needs scientific cognition. When science expounds the abstractness of the phenomena in nature, more simple the elaboration is, more extensive the application is, more profound the scientific creation is. While arts arouse human's cherished emotion. More sincere the emotion is, more general the research is, more valuable the artistic creation is.

II. The Analysis on the Unity of Scientific Education and Artistic Education

1. The Unity of scientific education and artistic education lead to the healthy and harmonious development in physiology and psychology and realizes the comprehensive education.

As a relatively independent factor of education, artistic education plays an important role in the development of human's rational factors and in the stimulation of creativity in human's brains. At present, scientific education focuses on the left brain, regarding cognition but despising emotion. Rationality oppresses irrationality, but neglects human's subjective consciousness, the liberation of it, the construction of sound personality and the improvement of humanity in society and leads to the callosity in psychology. If a young man who grasps the principle of light refraction is indifferent to the flowery rainbow, we can see his education is unsuccessful. Physicist Yang Zhen-ning points out: "science and beauty cannot be divided; art and creation are closely connected. The learning of art can not only help college stu-

dents improve their attainment, but are beneficial to the cultivation of creative consciousness and abilities. " Actually many scientists are artistically accomplished and realize the art's role in their scientific research. Geologist Li Si-guang was the first one to compose the violin melody in China; Qian Xue-sen once pointed out the help of music for himself; the owner of Nobel Prize of 1981, Hoffman once said that college students should take advantages of the chance of study provided by colleges and greedily absorb the great achievements of culture—literature, art and music. Therefore, it is indispensable to unify scientific education and artistic education.

2. The unity of scientific education and artistic education lead to the perfection of personality and the realization of integrated education.

Personality is the consequence of the integrated education. If the education of social consciousness partly functions, for example, morality forms the moral principles; politics forms the political points of view; philosophy forms the view of world; science turns human into scientists. Art has a complete effect on wisdom and soul. The effect of art can touch every corner of human's soul and art builds the integrated personality. Artistic education can purify people's emotion, make people sincere, kind and beautiful and enrich educatees' soul with opening-up, capability and the pioneering creative spirit. Modern education is not only a teaching activity, but also a psychological process to build people's soul, a process to develop people's psychological capability to the limit in a free and harmonious condition. The purpose of education is to make the educatees know and rebuild not only the surrounding world, but also people's inner world in the law of beauty. The education combined with science and art is the key point for success. As what has recognized by the modern education, "The aim of education in broad sense is to combine a person's physical strength, wisdom, mood, ethic and other factors together to build a perfect one."

3. The unity of scientific education and artistic education lead to the realization of true freedom.

"Instead of getting rid of natural laws and independent in imagination in fantasy, freedom is to cog-

nize these laws and to utilize them serve for certain purposes." The scientific education helps people reach the first step of freedom—the cognition and mastering of laws, which make an preparation for practice. While art is indirect, but it endows people the attitude and value of practice. Therefore, people can take part in practice, surpass the reality and fight for the sublime dream under the premise of experience. The unity of scientific education and artistic education complements and adjusts the scientific logical thinking with the free imagination of art. It leads people's practicing activity to a new level to realize the real freedom of spiritual life.

III. The Conception of Unifying Scientific Education and Artistic Education

1. Imagine Education

Through the creation of vivid and beautiful environment, the imagine education takes full advantage of the function of images to stimulate the mood for study and the potential wisdom to grasp knowledge, comprehend laws, develop the way of thinking and accelerate the educatees' comprehensive, harmonious development. Lost of charming, fascinating education activities express and permeate the beauty of science, society, nature, art, even laws, principles, formulas and practice. People are moved and enchanted by poems, music, painting, sculpture and dramas, which break the old tradition and create the enthusiasm and new concept in life. That's because scientific education and artistic education can manifest the characteristics of the main part of life at best and both contain personality and concept. From scientists' point of view, the abstract formula and definitions are pretty because they not only reflect the inner harmony of nature, but people's freedom as well. In the process of scientists' exploration of the nature's mystery, they find nature's harmony, rhythm, melody and order of its own. They appreciate this kind of pleasure. Somebody praised Einstein's theory of relativity is a great artistic masterpiece. French mathematician Poincare believes that it is the natural beauty that arouses the scientists to explore painstakingly with a pleasurable mood and it is the pursuit of the u-

nity of a harmonious nature that gives scientists an infinite faith in truth. Looking through the history of art, we can find lots of mutual acceleration between science and art. Especially in the history of artistic creation, the progressive development in almost each branch is the consequence of the breakthrough of scientific technologies. From the remote ages, the development of music has been continually driven by the progress of scientific technology, bone flute driven by sculpture, chime bells driven by metallurgical industry, piano driven by the complicated mechanical knowledge. If there's no the research of the Greek mathematics, the strict mathematical relation of the Temple of Parthenon won't exist. So won't the great achievements of bronze without the advanced bronze metallurgical industry, the strict perspective painting as "The Last Dinner" without da Vinci's research of perspective, the paintings of impressionist school without the research achievements of optics and chromatics in the 19th century, the computerized music and painting without the advanced scientific techniques. People are living in a multiple reality, where the contemplating world in philosophy, the logical world in science and the imaginative world in art are meaningful and mutually relative. They are all controlled by the law of beauty, even when people receive the imagine education and enlightenment under the law of beauty too.

2. Emotion Education

The focus on emotion education is an important factor in the realization of the unity of scientific education an artistic education. Emotion education starts from feeling, makes people moved with it, instructs principles with strong emotion and takes oneself as an example to explain. It can turn the abstract concept into abundant imagination, the stiff instruction into the practice of appreciation, whose subjects will get stronger with richer and more sublime emotion. For the function of emotion, Leninal said that it's impossible and never possible that people would start the research of truth without emotion. Liang Qi-chao made a sharp comment: "Emotion is the holiest in the world...From ancient to present, the famous religionists and educationists pay much attention to the culti-

vation of emotion." It is said that the famous astronomer Kepler was enlightened from the classical music "Harmonious Sinfonia" and comprehended the law of planets' movement. Emotion education leads people to the new vista and rises up to the rational way of thinking in the appreciation of art. For example, rivers, the moon and woods are objective things from the rational points of view. They are so common that everybody can see them. But they are totally different from poets' points of view. "Harmonious Moonlight Romance" by Zhang Ruo-xu in Tang Dynasty praised the river in a spring, moonlit night and raised such questions: who was the first to see the moon by the river? And when was the moon first shed light on? This poem has become the reflection not only of science and philosophy, but of education, life and universe as well. The poet's passion and experience run through the poem, which uses the images to reflect the abstractness. Only in the art can rationality and irrationality reach the harmony thoroughly. These qualities are just what education try to cultivate. Especially at the present, there's a cultural crash between scientific education and humanistic education. It is art that can liberate human beings from predicament and reach the highest realm. In reality, the dream we are trying to realize is to make our lives better with art and to make art more useful for our lives. Therefore, we get that art is not made deliberately but the comprehension of existence. The task of education is to give the educatees the comprehension and to discover the uneven from the even, vice versa. So everybody can change the mind and raise disposition. To be concrete, green grasslands, ancient passages, west wind, horses, bridges and houses are uneven above the simple life as well as even for the educatees. When they get this point, their personalities rise to a higher level, which is more meaningful than the environmental protection or the preservation of the ecological harmony.

3. Value Education

Scientific education and artistic education are not only the appreciation and experience, but to explore the beauty and to build the clear consciousness for the value of appreciation. The significant way to

reach the perfect personality for the educatees is to know the process and the laws of facts, to make confirmed the significance of facts for the individual and society and to build an individual's sense and consciousness to realize the ideal education of truth and beauty. Only if an individual with a dream guided by the appreciation of beauty can strive for truth and the happiness for the public. People can master the inevitable tendency and the law of the developments of facts through science. On the other hand, the artistic education exposes the truth with the thinking of images, complements the disadvantages of dream and morality and leads people's spiritual world to truth and beauty. Schiller believed that's a process from appreciation to morality, from a sensible man to a rational one. Therefore, Dewey believed that artistic appreciation was not the luxury of education, but the powerful expression to give any education the value. Only if people look forward to beauty and cognize love, the most valuable beauty, can an individual take the responsibility consciously and build the rational, harmonious world.

4. Freedom Education

Freedom education is the highest stage of the unity of science and art, a necessary way to cultivate the creative talented man and to realize people's free existence. The key points for freedom education are the creative activities, which can fully manifest one's identity and the cognition originated from laws. Creation is the most valuable activity for human beings. It combines people's talents and ability to build a lively situation and surpasses life time and time again. So creation is the fullest manifestation of human's essential power. The most important point for the freedom education is to cultivate the educatees' consciousness of participation. Otherwise, it's impossible to make creative activities. The modern educational theories affirm the subjective function of study.

It is the continual assimilation and acclimation between the subjects and objects that can build a harmonious atmosphere and the development for an individual. Modern education focuses on the exploration and the discovery of study. For example, Bruner's theory of discovery is based on the conscious participation of creative activities. An educatee can become a discoverer through creative study, which uses people's curious nature to explore, creates strong need to express and gives the learner the pride in mastering knowledge. Then the confident and strong personality built. The activities of exploration turn the objects of cognition to the objects of emotional experience. The subjects' single function of cognition turns to the appreciation of beauty participated with the whole body and soul. Not only is the mastering of knowledge more effective, but the consciousness of participation develops as well. Therefore, the educatees can master laws and realize their identities through the freedom education, which can cultivate more creative talented men for society.

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