

# The role of a (toner) education in steam Education

Jianying Zhang

Beijing DongchengHeizhima Hutong Elementary School, Dongcheng District, Beijing, 100009

**Abstract:** To comprehensively strengthen and improve school aesthetic education in the new era, it is necessary to build an education system for the comprehensive cultivation of morality, intelligence, physique, art and labor. In addition to strengthening the function of school aesthetic education, how to endow the needs of school aesthetic education in the new era, and what role does it play in steam education with interdisciplinary learning characteristics? This paper attempts to explore the role of toner teaching in steam Education under the background of primary school science curriculum by taking the importance of toner education in steam education in aesthetic education as the research point.

**Key words:** toner painting; Art; Steam education; role

## 1 From stem education to steam Education

Steam education and stem education are both educational concepts that help students improve their ability to solve problems. Steam education is the integration of humanities, art and other disciplines on the basis of stem. This concept proposes that we should not only consider science and technology engineering and mathematics, but also treat these disciplines from the perspectives of aesthetics and sociology. It proves that stem education mode has experienced a major thinking breakthrough along the “interdisciplinary integration”. Has joining steam education a changed anything? Where is the role of a? According to CNKI, the role of aesthetic education and art in steam education can help correct the tendency of overemphasizing subject knowledge and skill education, help integrate the study of Humanities and arts with natural science, help students better understand nature, society and life, and better form a healthy world outlook, outlook on life and values. Relying on the 2022 edition of the primary school science curriculum standard, based on the greenpower energy vehicle course, a project-based learning course of the student development center in Dongcheng District, Beijing, and using the on-the-spot resources of the Beijing pastel base school, pastel was introduced into the school’s characteristic courses in the course implementation, teaching design Practical activities and other aspects to explore the steam education in line with the implementation of Arts Education in the regional characteristic schools in Dongcheng District. Teachers’ teaching based on artistic practice enables students to actively participate in creative interdisciplinary inquiry activities, which has a far-reaching impact on students’ learning ability, knowledge application ability and the development of creative thinking.

## 2 In depth interpretation of the role of art in steam Education

### 2.1 The role of art in art education

According to textual research, art comes from human labor, and its works show the pursuit of human life and co-exist with human beings. Art has penetrated into all aspects of human life, extending an indispensable part of adult life and survival, and art education especially for teenagers has given logical inevitability and rationality. Art education is different from general life, knowledge education and moral education in the strict sense because of the essential characteristics of art. The role of art education is diverse and integrated. It is a special way to develop students’ realistic emotional mechanism healthily. It can tap everyone’s creative resources and integrate them into an indispensable part of students’ complete education. Therefore, from the perspective of school education, art education is an indispensable way of education for the effective implementation of comprehensive quality education.

### 2.2 The role of art education in steam Education

The role of “a” in steam education has been studied in detail in the theoretical and practical research of domestic scholars, including five kinds of contents such as fine art, six dimensional concepts such as big art perspective, and four functions such as enhancing creativity. The reconstruction of independent disciplines with practical value along the mode of “interdisciplinary integration” is not only a new mode of educational spirit, but also a reconstruction of the dominant teaching practice methodology and implicit educational values at the educational level. Dr. zouxiaodong first put forward the concept of a-stem education in 2016, and the a letter is prefixed as an independent element in the model, which reflects the important role of the humanities and arts discipline in cultivating “people” with complete personality, the discipline leadership potential of integrating other disciplines, and the contradiction between it and the science and technology discipline in terms of discipline characteristics. At the same time, it conveys the information that artistic creation, in addition to the activities involving the whole brain and emphasizing the a of right brain thinking, is more helpful to improve the learning motivation of steam education. In the process of hands-on, they will solve life problems and create aesthetic products with intuition and implicit knowledge. The successful connection between art and steam education provides effective teaching model and necessary support and structural research, which is more conducive to the research on the role of specific aspects in steam education in art education.

### 2.3 The role of toner painting education in steam Education

Toner painting, boosted by professional art education, has been revived and developed in domestic art education. In 2016, the collaborative innovation of four districts and five schools’ pastel painting project carried out by Beijing Pastel Painting Research Association

in the pastel painting base school provided an opportunity for the green energy vehicle project-based learning curriculum activities of the black sesame Hutong primary school in Dongcheng District. The curriculum linked with steam Education tried to integrate interdisciplinary courses, integrating the form of pastel painting and the content of scientific disciplines to carry out micro curriculum research in the field of scientific material knowledge; With the same course and different structure of mathematics, we can understand the knowledge of another subject with the help of one knowledge; Blending with the physical education discipline to understand the complementarity of students' body structure and mechanics; The integration with the comprehensive practice discipline further improves the ability of autonomous learning, team cooperation, interpretation and hands-on innovative practice. And then improve students' comprehensive learning ability, make the course activities more in-depth with practice, and explore the role of pastel painting in steam education.

### 3 The art integration mode of toner painting in steam Education

The purpose of studying the role of toner painting education in steam education is to have a deeper understanding of the root causes of the shift from stem education mode to steam education mode. From the perspective of teaching practice methodology and educational values, this paper analyzes the role of toner painting art in steam education and its practice integration mode framework, and explores multiple strategies for steam education, It can provide theoretical and practical reference for the active exploration and in-depth study of the transition from stem education to steam education, and inject vitality into the "a" element in steam education.

Steam education needs to be built on the connection of interdisciplinary thinking methods and the ability to combine artistic spirit with practical engineering practice. Open the art history books, it is not difficult to find that a is closely related to scientific engineering and mathematics. Michelangelo, one of the three heroes of the Renaissance, is known as a painter, sculptor and architect. He often uses colored chalk made of mineral powder to draw their creative manuscripts and works, which is thick, free and easy, and rich in layers. The vault designed for St. Peter's Cathedral in the Vatican involves engineering mathematics, material space, lighting effects and aesthetics. Besides eye opening, it also provides teachers of visual arts education with specific creative teaching materials. It can be seen that the visual art discipline itself has integrated different categories of knowledge, and it needs many experiments to specifically complete the creative ideas and aesthetic performance. Color chalk shows its unique advantages. For "learning", it has simple techniques, rich strokes, strong expressiveness and strong operability; For "teaching", it has the characteristics of intuitive teaching demonstration, excellent work effect, and easy to instantly reproduce color images. Therefore, based on the use of traditional art media, the appearance of colored chalk in the interdisciplinary teaching classroom will help enrich the traditional painting techniques, make students more convenient to create paintings, and achieve the teaching purpose. It is a new way for us to assist the teaching of painting. It is no wonder that painting masters, architecture masters and Engineering Masters use pastel painting to create. The ancient Roman architect and engineer Vitruvius put forward the concept of beauty in the ten books of architecture written in the first century A.D., and proposed that beauty has a golden ratio. According to Vitruvius' view, Da Vinci once drew a famous architectural human body scale map, which showed that in the square and circle of the cosmic order, the human body structure also has a perfect ratio of the golden section.

Pastel painting is a kind of generation and creation. In aesthetic education, her intervention reconciles the right brain of creative and artistic thinking, showing students' ability to design and formulate specific and creative solutions to enhance students' ability to comprehensively apply interdisciplinary knowledge and skills. In the project-based learning course of green energy vehicles, students mobilize the comprehensive application of pastel painting to design the relationship between aesthetic modeling and structural materials in the practice of vehicle shape, which is the connection of interdisciplinary knowledge and interdisciplinary thinking methods. The design and display of the car appearance is precisely the students' integration of knowledge system and thinking method to create a car appearance with engineering technical efficiency and aesthetic feeling as well as social humanistic care and warmth, which shows the students' comprehensive ability to apply thinking tools to design practice. It is not difficult to find that the practice of art integration is a compromise. Equal integration is the most respected but the most difficult to achieve. Auxiliary integration and social integration are more in line with the existing practice of the school, while emotional integration closely fits the teacher and the goal. How to teach science and other disciplines equally through art requires the content standard of each subject, and is evaluated at the end of the course, so as to design a more fully integrated steam course unit. Integrate art equally into other disciplines in steam education, give play to the synergy between disciplines, and make students' learning naturally permeate or occur at the same time in different learning fields. Table 1 embodiment of "golden section" in different subjects

Design intent: the golden section is recognized as the embodiment of harmonious beauty. It not only plays a magical role in mathematics, but also can be found in architecture, art, natural phenomena and all fields of human life, which is the magic of the golden section.	
Scientific disciplines:	Mathematics:
Engineering, the application of relevant scientific knowledge and technical means to transform existing entities into man-made products with expected use value. In the practice class of the characteristic course, the shape design of the car body is the key influencing factor in the racing car. The ratio of wheelbase to body length, 1:1.618, is usually used in automobile styling design. Let students express their design ideas through sketches, solid edge modeling software, etc. The	Mathematics, just can let people more objectively and accurately find the mystery. In the mathematics activity class, selecting the theme of "golden section" can effectively stimulate students' interest in mathematics learning, make them feel the spirit of mathematics, and grasp the ideas and methods of mathematics. Therefore, combined with the teaching of

seemingly beautiful body shape often not only brings visual pre pleasure, but also has a good knowledge base of aerodynamics and bionics, which can effectively reduce wind resistance, crowd out crosswinds and improve driving stability.	“comparison” in Grade 6, the author opened a mathematical activity class with the theme of “golden section”.
---	--

Therefore, it is no longer art for the sake of art in education, but emphasizes the exploration of students' visual art forms in the production process or life contact. Students do not need to use the standards of science to determine right and wrong to measure the works represented by pastels, but to practice, and then guide students to gradually construct their personal visual cognition from the composition of conscious things. Artistic creation, artistic literacy and value judgment.

#### 4 Summary

The role of a (toner painting) education in steam education makes modern science more and more “scientific”, and art will continue to make modern science more and more “artistic”. This two-way interactive process can be said to be repeated in dynamic changes. It is also a factor that needs attention in steam education.

#### References:

- [1] Wu Qi Aesthetic education, art and steam education concept [j]Educational science research, 2022 (2): 1
- [2] Gang Li,lijie lv From stem education to steam Education: analysis of the role of Arts [j]China audio visual education, 2018 (9): 10
- [3] Juanjuan Wang Analysis of the role of Arts in steam education [j]Educational practice and research, 2021 (3): 3
- [4] Yongsong Wang On the history, current situation and the development of compulsory education of toner painting in China [j]New education era e-magazine (Student Edition), 2018, 000 (013): 88
- [5] Ye Jin Mr. Yan Wenliang's artistic path -- Speech at the symposium celebrating Mr. Yan Wenliang in Shanghai [j]New fine arts, 1982 (4): 2
- [6] Xinquan Zhang Research on toner painting [j]Decoration, 2002
- [7] Ying Chen,Zhenguo Chen A-stem: value reconstruction of interdisciplinary integration education [j]Research on education development, 2019, 39 (6): 8
- [8] Baodong Wang On the language of contemporary toner painting [j]Modern decoration: theory, 2011 (7): 1
- [9] Huichen Zhao,Xiaoting lu Carry out steam education and improve students' Innovation Ability -- an interview with Professor Gretel Ackerman, a well-known scholar of steam education in the United States [j]Open education research, 2016, 22 (5): 7
- [10] Yugui Guo,Shuwei Qiu The traditional function of art and art education and its new role in the era of knowledge economy [j]World education information, 2011 (3): 6
- [11] Haiping Wang Research on the current situation of toner painting in China [d]China Academy of fine arts.2019
- [12] Yulei Chen Research on digital chalk and its application technology [d]Nanjing University, 2012
- [13] Youdeng Chen Exploration and reform of toner painting talent training in Colleges and universities in the new era [j]Journal of Shandong Institute of Arts and crafts, 2021 (5): 5
- [14] Fen Xu,Xi Zhang Research on the teaching application of toner painting course in Colleges and universities [j]Modernization of education, 2017 (07): 60-61+66
- [15] Xiaoli Yang,Fei Wang,Xiaoli Lu On toner painting in art [j]Art evaluation, 2020(12)
- [16] Zhibin Zheng,Yan Zhang,Zhengxing Sun, etal Simulation of toner painting based on reference image [j]Chinese Journal of image and graphics, 2013, 18 (11): 9

**Note:** This paper is the scientific research achievement of the 2019 youth special topic “green energy vehicles based on students' ability development and steam Education under the linkage of project-based learning” (Project No.: ceca19143) in the “13th five year plan” of Beijing educational science.