



# Cultivation of Creativity in Drawing and Design Classes Based on Brain Science

Hongyan Cong\*

## ABSTRACT

The purpose of the study is to make the track of cultivation of creativity clearly show in classroom teaching. Under the further extension of the theory of reconstruction effect of floating chain, this study puts forward eight viewpoints and some concrete cultivation methods for cultivation of creativity in art class. Aiming at the possible problems of cultivation of creativity in art classroom teaching, this study provides examples of cultivation of creativity in art design class, art appreciation class, art creation class, art comprehensive activity class and clay sculpture class. It is found that most of the students do not form psychological illness, but they are affirmed by most teachers that their personality has obvious defects. The theory of reconstruction effect of floating chain reveals how the visual thinking training of art subject affects the development of creativity and explores the effective methods of cultivating students' creativity in art classroom teaching.

**Key Words:** Brain science, art class, cultivation of creativity

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## Introduction

These three factors that people become richer, technology becomes more advanced and the world becomes more and more closely connected are closely linked into a driving force pushing society into a new era. This explains how we move from the agricultural age to the industrial age and then into the information age. Nowadays, this model reveals how we are moving into the conceptual age driven by three factors (Yuan *et al.*, 2011). In the context of economic globalization, the core of competition is the brain. In the enterprises, people with creativity become the special talents who are precious wealth of the enterprises and can create considerable economic benefits for the enterprises. At the same time, people emphasize creative leadership and management skills and no longer adhere to the rules. Jobs was once fired by the company when he founded the Apple computer, and later he was invited back by the company with his unique idea of "ipad", a product that Apple

computer depends on to create amazing economic benefits for the company.

Creativity is the work ability to create novel (initiative and unexpected), high-quality, and appropriate (useful and satisfying the constraints of a task). From the individual level, creativity is related to solving the problems in daily life and work, but from the social level, creativity can bring new discoveries in science, trigger new movements in art, stimulate new creations and promote new social process.

In the 21st century when attention is paid to cultivation of creative talents around the world, the development of Chinese children's creativity is not optimistic. According to a survey by the International Assessment of Educational Progress on 21 countries in the world, the computing power of Chinese children is the strongest in the world, but their creativity ranks last fifth among all countries in the survey (Shi *et al.*, 2011). One

**Corresponding author:** Hongyan Cong

**Address:** Xi'an Polytechnic University Digital Image Art, Xi'an 710065, China

**e-mail** ✉ hongyancong1472@126.com

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American commenter once commented on the issue that the Chinese were unlikely to make great achievements in the short term. His comment is a little radical. However, although China's economy is improving, its innovative products are not enough. In terms of the cultivation of creative talents, China's education is usually "the use of known reasons and the use of known logic to obtain known results" (Lyshevski, 2010) in the words of a Chinese expert. Under the 20-year-old "imprisonment", the answers are usually based only on the authoritative standard answers or on speculation to choose the least risky answer. Therefore, the creativity of the Chinese has all gone. Of course, the study believes that many aspects will be involved to develop the creativity of students. The society, family and school should do something for the cultivation of creativity. This study is to combine the research of brain science, and gropes for the methods of effectively improving students' creativity in art classroom teaching through classroom teaching practice.

Creativity is a kind of thinking ability and a kind of thinking course. Is creativity born hereditism), influenced by environment (environmentalism), or from education (education theory)? At present, there are still many different opinions on the origin of creativity and there is no final conclusion. Some scholars believe that school curricula should include various kinds of divergent thinking training to improve creative thinking ability from the beginning of children's education (Kim, 2008). Under the background of this thought, the viewpoint that educators do not need to be creative comes into being, holding that the level of American educators is not necessarily higher than that of Chinese educators, but American educators do not kill the creativity of students in the teaching process and even play a protective role so that there is a significant difference in the creativity between Chinese and American students (Komninos, 2008).

### Methods

Although there are a lot of literatures about the cultivation of creativity, most educational research literatures have avoided this very fundamental problem. The production of creativity seems to be related to psychology and neurology. However, many psychologists and neuroscientists often think that the formation process of creativity belongs to the category of educational research. Therefore, there are three

areas where the definition of creativity has been controversial so far. In addition, a large number of scholars in educational circles think that the formation of creativity is the function of non-intelligence factors while some scholars believe that the creativity is inborn ability and talent. Thus, only when we really realize what creativity is, can we construct the classroom teaching strategies for cultivation of creativity from its occurrence and development law.

In order to find out the reasons for the development of creativity, the study should refer to not only the current literatures on the definition of creativity and the analysis of creativity, but also the books on neuroscience, brain science and biology as well as some brain wave CT data to reveal the formation law of creativity.

### Results and discussion

The theory of reconstruction effect of floating chain emphasizes that the enrichment of conceptual attribute of a thing plays an important role in the formation of creativity. The conceptual attribute of a thing is not the smallest molecule. However, only through its reorganization, it is possible to produce new things. Therefore, it must be that the richer it is, the better it is. Through training in knowledge processing and memory skills, we can build a larger library of creative materials to lay the foundation for the production of new creativity. The human brain is a wonderful thing: the more we keep practicing building new connections between different concepts, the more innovative creativity is easily produced, as shown in Figure 1.

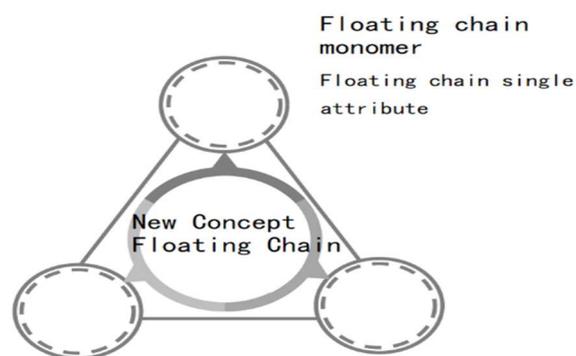


Figure 1. Top view of flotation chain

The above figure is a top view of four floating chains with four dense concepts closing to each other. Although the reconstruction phenomenon has not yet occurred, we can predict

that the middle black part has the possibility of forming a new concept because it already has four attributes brought by adjacent floating chains. When these attribute are enough to meet the conditions of formation, a new concept is formed.

So in art class, teachers must widen students' scope of knowledge and ask them to participate in various interdisciplinary activities. For example, Jing'an No. 1 Central Primary School organizes students to take part in international tour activities every year and the students have already visited Japan and Italy. This provides students with all kinds of information and creates an atmosphere of spontaneous contact with all kinds of information to expand students' knowledge reserve, which is the basic condition for creation (Lombardi *et al.*, 2015).

In the art class, we can carry out analogical trainings and these fields can involve nature, technology, society, spare time, animals, plants, fables, science fiction, novels and so on, as well as our own cultures, foreign cultures and symbols. Misunderstanding and error are the basis of many major inventions, which is the advanced stage of analogy. We can also help students carry out some revolutions of materials and explore more interesting materials to express the same topic. When students have an in-depth understanding of the concept of attributes, these alternative thinking can be reflected in many art teaching activities. If students harvest sufficient fruits from every art lesson, they can see their own progress in improving their own works. This is why the experimental group stresses that students must retain their dissatisfying works, and encourages students to find ways to improve the pictures. In the experiment, students are told that they cannot destroy all the works that they are unsatisfied with but they are allowed to cut out the parts they are most satisfied with for reconstruction. This is a new work "Nest" combined by two unsatisfactory works, as shown in Figure 2.

Human's ability to accumulate knowledge and construct new ideas on the basis of their knowledge is the foundation of enormous generation ability that makes creativity possible. If the attribute of the original concept is compared to an embryo, the embryo can fit into the environment and slowly evolve into something new that conforms to the new environment as long as the environment is suitable (Knut and Georghiou, 2010), as shown in Figure 3.



Figure 2. Art student modify design drawing

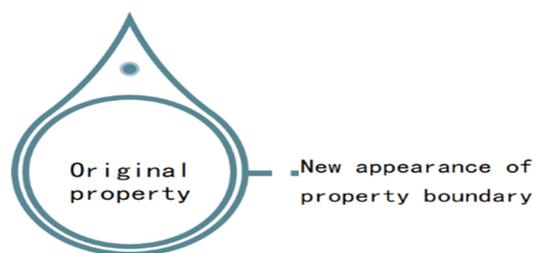


Figure 3. Concept embryo

Figure 4 is performance items drawn by the experimental group. In the background of the study, the window is a three-dimensional view, and out of the window is an inverted box inner wall. The desk is an outward demirelief, but the line with the perspective effect is partly in the plane background. Some parts directly use actual perspective rays and these secrets of perspectives can only be discovered when you stand at a particular angle. The telephone on the desk and many of the details in the ferris wheel use the method of varying angles, making the ordinary picture novel.

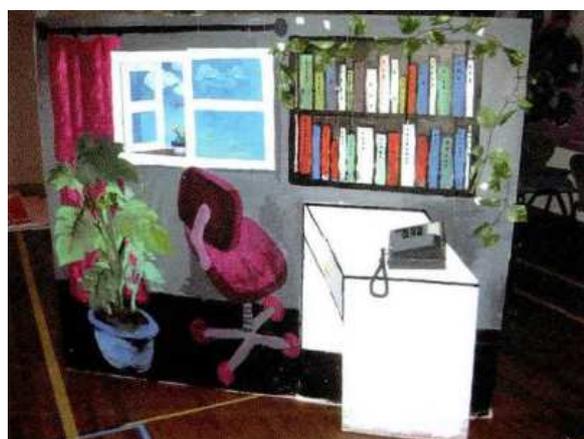


Figure 4. Performance items drawn by the experimental group



**Figure 5.** Brain structure of hyperactive students

In the class, students' incomppliance, unconventional thinking, daring to question and expressing a stand is also easily mistaken for some disciplinary issues. Therefore, only by understanding the personality characteristics of creativity can we distinguish and give correct guidance, or give certain tolerance for these behaviors. Moreover, the more we know about students' living conditions and their special habits, the more creative information we can get. In the experiment, according to the common judgment of four art teachers, seven students with the most creativity in art creation are selected from 1,000 students. Teachers in the study group find that six out of seven students (86% of the total) do not constitute a psychological illness, but most teachers think that their personality is obviously deficient. Subsequently, the teachers classify the six students, and find that three of them have obvious characteristics of lonely tendency. These three students do not speak much and are introverted. The other two students are eccentric with radical behavior tendency. The remaining one student shows hyperactivity with many disciplinary problems, as shown in Figure 5.

### Discussion

It has been proved that the level of creativity is influenced by the ways of heredity and acquired cultivation by study. Besides, the study has found the psychological and physiological law of creativity formation, puts forward the theory of "reconstruction effect of floating chain" of cultivation of creativity, reveals how the visual thinking training of art subject affects the

development of creativity, and explores the effective methods of cultivating students' creativity in art classroom teaching. This theory leads to eight important viewpoints of cultivating creativity in art class: 1. the enlightenment of neuron growth law on art class; 2. the effect of brain function differentiation on the learning content of art class; 3. the enlightenment of the change in synapse density of cerebral cortex on creativity; 4. the enlightenment of neuroglial cell function on art class; 5. requirements of human brain functional difference for tolerance and equality in art class; 6. requirements of brain biochemical reaction for passion in art classroom; 7. misunderstanding of right brain development out of art class 8. the enlightenment of prefrontal cortex activity (spatial intelligence) and electric skin reflection (Miguel *et al.*, 2008). From these eight viewpoints, suggestions are provided for art class: 1. suggestions on art teaching design for cultivating creativity; 2. suggestions on art classroom environment for stimulating creativity.

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