

# The inspiration and research of Joseph Albers' color teaching theory to high school art color teaching

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**Abstract:** In the 1980s, the state paid more and more attention to youth art education. The big background of the development of education in the 21st century is the core of quality education as the main line, general objective requirement in the course content, teaching methods, curriculum evaluation and so on multiple level, diversification of teaching enables students to better understanding and perception of art, and art unique ways and techniques are used to express their emotion, attitude, so as to realize the all-round development of students' comprehensive quality. As the foundation of fine arts education, color teaching aims to guide students to correctly understand the beauty of color, and cultivate students' ability to flexibly use color to construct pictures and express emotions. Josef Albers was one of the most influential art educators of the twentieth century. This paper focuses on Albers' inspiring curriculum teaching plan "The Interaction of Colors" and conducts research on color teaching in high school. The curriculum forms a systematic teaching content in the form of topics, organically integrates science, technology, art, mathematics, visual perception and other aspects with the characteristics of interdisciplinary learning, and uses the teaching method of "learning in context" to enable students to perceive the properties of materials. Life experience and color theory are used to re-understand color and make works. On this basis, the author internalizes the characteristics of high school color courses, enabling students to learn to view images, actively think and participate in them, cultivating students' visual aesthetic experience and improving their humanistic quality.

**Keywords:** Color teaching theory, Situational teaching, Learn by doing

## 1. Introduction

The second chapter analyzes Albers' teaching concept and the teaching content of the Interaction of Colors from the perspective of art history. The third chapter mainly introduces the domestic aesthetic education phenomenon as a whole, takes the color teaching of the 2019 edition of high school art textbooks as the main line, and combs and analyzes the status quo of high school art color course and the problems in art teaching. The fourth chapter is the focus of this paper, which is based on teaching materials, art curriculum standards and learning conditions, adding color composition courses based on visual literacy and interdisciplinary interaction, reflecting on course design activities and teaching practices in detail, deepening high school art textbooks and expanding color system courses. The fifth chapter summarizes and redefines the relationship between Albers' color teaching concept and middle school art, and looks forward to the possibility of color curriculum reform in the future. In this paper, the author takes classical research as the cornerstone, on this basis to do meaningful and capable teaching research, and find the possible innovative value of this topic.

## 2. Understanding Josef Albers and the Theory of Color Teaching

### 2.1. Joseph Albers Life and Experience

Josef Albers was born in 1888 in Portlope, Germany, and spent his early years as an elementary school teacher in Portlope before attending the Royal Academy of Fine Arts in Berlin, the Eisen School of Arts and Crafts, and the Academy in Munich; Albers entered the Bauhaus Academy in 1920, and continued to teach after graduating from the school in 1923; in 1928, Albers took over full responsibility for the basic course at the Bauhaus Academy from Moholy, and in October 1930 began teaching the upper-level figurative painting course. In 1928, Albers succeeded Moholy in assuming full responsibility for the Bauhaus Institute's basic program and in October 1930 began teaching the upper-level figurative painting

course.<sup>[1]</sup>He is considered one of the most representative figures of the Bauhaus spirit.

When the Bauhaus was forced to close in April 1933, Albers moved to the United States, where he became head of the department at Black Mountain College in the same year, during which time he was in charge of the basic teaching of color and drawing; he served as the president of Black Mountain College from 1948 onwards, where he pioneered a series of pioneering methods that made it a pioneering school in the United States that used experimentation as a basis for its teaching; however, he was forced to leave the college in 1949 due to political considerations.

From 1950 to 1959, Albers taught at Yale University, where he served as chair of the design department, and during this time he was a visiting scholar at a number of European and American universities, including the Ulm School of Design. Albers died in New Haven in 1976 at the age of 88.

Albers received numerous commendations and honorary degrees throughout his life and was elected a member of the National Institute of Arts and Letters in 1968, and in 1971 he was the first still living artist to have a solo retrospective exhibition at the Metropolitan Museum of Art in New York City, and has become one of the most widely exhibited artists, as well as one of the most influential art educators of the 20th century.

Even before the discovery of optical art, Albers was aware of and explored the principles behind it, and his study of line and color interaction has evolved towards individual innovation and individualism. His unique approach has had a significant impact on the development of the contemporary art movement. Albers' color studies also included scientific and mathematical aspects, thus internalizing the logic and perception of color. Until his death Albers continued to explore the mysteries of color, which he believed had no end.

## ***2.2. Albers' Teaching Philosophy***

In 1913, with the rise of modern European art in the United States, Josef Albers, whose experience teaching at the Bauhaus, Black Mountain College, and Yale University refined a new philosophy of art education, was influenced by John Dewey's doctrine of art, which criticized academical art, stating that "art is born of experience," and that works must be viewed from different perspectives of observation and production in order to gain true insights, in addition to technique. It must also be viewed from a different perspective of observation and production in order to gain true insight. Albers teaches his students that the different artistic disciplines are harmonized and interconnected, and that by sensing the nuances of the different forms in the patterns, he can heighten their sensitivity; and that this can be used as a foundation for breaking through stereotypes, asking questions, and building up their own feelings. He illustrated his educational ideas with a series of classroom examples and encouraged his students to engage in in-depth theoretical exploration.

Albers' teaching in the Bauhaus was more connected to society, and therefore focused more on the relationship between art, design, and utility; Black Mountain College's principle of no preconceptions was relatively relaxed and liberal; while the Bauhaus focused on architecture and design, Black Mountain focused more on a broad arts education, or liberal arts education.

### ***2.2.1. Educational method***

From the Bauhaus to Montenegro to Yale University, Albers brought educational methods developed in Germany to the United States and spread them around the world. Albers' educational model, compared with other outstanding design and art educators of the 20th century, changed the core of art and design education in the early 20th century: from imitation to creation. At the same time, it also marks the gradual shift from the traditional art education for the purpose of cultivating talents to the modern design education for the purpose of cultivating artists and designers.

Albers divides visual arts education into four aspects: history, technology, procedural methods, and perception. Take a four-year university as an example, the first year begins to cultivate perception, which lays the foundation for later learning; The second and third years begin to learn technical and procedural methods; The last year is practice; History is taught throughout the course of study.<sup>[2]</sup>

In this case, perception is the most difficult to grasp, and the traditional way of learning is mainly to imitate and express their emotions. Albers believed that emotions, feelings, and self-expression that could not be expressed in words could not be taught, but that students could be taught the methods and laws of analyzing color, line, shape, space, and form. In class, when students talk about these elements, Albers has a serious discussion with them.

If he talked about his own feelings or profound truth, he asked the students to think first and then talk. While traditional art education emphasizes students' innate abilities, Albers believes that perception can be developed through training. He believes that even teachers should not force students to do things against their will.

### ***2.2.2. The influence of Joseph Albers' art education thought on modernism***

In the early 20th century, Albers promoted the reform of handicrafts, and Bauhaus period continued to explore and develop, realizing the process of transformation from "craft" to "technology", while constructivism and Dada actively influenced Bauhaus.

At the same time, modernism has also had a certain influence on the practice of Chinese modern art. In the 1980s and 1990s, Chinese abstract art was transplanted from Western abstract art to self-conscious creation, which had an impact on contemporary Chinese art education. For example, in the color training of the art foundation course of the Central Academy of Fine Arts, the practice of using used colored paper for self-portrait tearing paper collage was influenced by Albers' color experimental research concept.

During his sixteen years at Black Mountain College, Albers successfully influenced Buckminster Fuller, Willem de Kooning, John Cage, Merce Cunningham, and other famous figures. As we all know, Fuller invented the world-famous "Fuller ball" at Black Mountain College and proposed the concept of "world Game" in the 1960s, hoping to find a systematic approach to global problems, so that all people can participate in changing the future.<sup>[3]</sup>

For nearly 40 years, Albers taught philosophy and psychology rather than art itself. Although Albers was invited to Yale University to teach painting specifically to graduate students, his teaching method was how to look at paintings. From time to time, for example, Albers would carefully spell out "abstract" diagrams with a ruler and pencil. Albers' observation of sketch encapsulates the essence of vision.

"Freedom without direction is not productive, and direction without freedom is not creative." Albers' demanding teaching set him ahead of his contemporaries in the basic education of design and art, institutionalizing the Bauhaus basic education system and developing his own creativity within a limited curriculum. He promoted the reform of the American university system in the history of art and the influence of Yale University in the field of graphic design. This is the essence of modern design thinking, which has influenced the basic design education in the United States and even the world.

Art and design are integrated. Image is one of the ways to express itself. Color is the core concept of plastic arts and the most appropriate means and concept to express the relationship between thought and nature. Among them, color teaching is the module that Albers focuses on in his teaching career, which requires long-term training to master existing schemas or languages to help students better observe and describe objects. In this process, traditional vocabulary, such as various training techniques, will become a kind of constraint. The purpose of color training is to pay attention to modeling skills, but also to divergent thinking and stimulate students' creative style.

### ***2.3. Color teaching theory***

The Interplay of Colors is Joseph Albers' unique experiment in the study and education of color cognition, which contains Albers' main theories about color. Howard Sauer Weaver said of the book, "The Interplay of Colors is the best passport to perception, and is fundamentally a process: a unique way of learning, teaching, and experiencing." This book expands the use and perception of color in art, architecture, textiles, interior design, print media and other aspects of technology. This book expresses Albers' scientific and rational working attitude, and confirms these theories with his own painting practice, focusing on the method of color research rather than the conclusion. Combining Albers' previous teaching experience, this book continues the implementation of basic practical levels, such as color experiments with colored paper; The question-based teaching method is inspiring to students and has the possibility of innovation, and the trial and error method becomes an effective learning method to train students to be good at observing colors, so that students can challenge traditional artistic precepts on the basis of building basic common sense. At the same time, this book is a continuation of the Bauhaus learning method, showing a way to enhance color perception and discrimination, so that readers can better understand color behavior. In Albers' own words, this is simply "a record of experimental methods of studying color and teaching color."

The plate for The Interplay of Colors was originally taken from color research completed by Albers' students at the Yale School of Art and published by the artist's choice. These works all highlight Albers' interdisciplinary focus on visual perception and the important influence art had on him.

John Eaton, a teacher in charge of basic courses at the Bauhaus, wrote a book called "Color Composition," which was distributed in China in the early 1990s. After Eaton, Albers served as the basic course teacher of Bauhaus and introduced the teaching concept of Bauhaus to the United States for the first time. Johann Wolfgang Goethe's *Fabianer*, published in 1810, became the model for Albers' teaching of color. Goethe's poetic imagination permeated Albers' teaching, especially the color course. Goethe's research in the physical sciences - light produces color - connects the direct and close relationship between man and science.<sup>[4]</sup>In his 1810 preface to *The Death of Fabianer*, which he translated into English as "color theory," Goethe proposed a subtle theoretical concept: any theory should not be a mere result first, but should be defined if it conforms to the laws of nature.<sup>[5]</sup>Similarly, Albers took his cue from Goethe, who consistently insisted in the *Interplay of Colors* that practice precedes theory, teaching a philosophical way of seeing rather than theory.

Albers expressed his scientific theory and rational attitude in this book, and at the same time, he reflected these color theories in his own paintings. In 1950, Albers began to create "Praise of the Square". Albers' works seem simple, but they have experienced a complex process of exploration and experiment, and are purely hand-drawn, and this meticulous work attitude is inherently difficult to replicate. He explores color relationships in his paintings, presenting the beauty of color harmony and contrast. Albers hopes to use his painting practice to refine and confirm the effectiveness of color theory, so that students can experience the subtlety of color. The book offers a new, interdisciplinary approach to Josef Albers' work, placing color within a broader discussion of the connections between art, visual perception, and modern science.

In this series, Albers examines in detail how each color is influenced and altered by factors such as size, distance, carrier, texture, lighting conditions, or boundaries. In 1963, Yale Press first published *The Interplay of Colors*, a book that has been criticized by many scientists and critics and is now the most basic teaching tenet of modern color teaching. By early 1968, *The Interplay of Colors* was sold out, and most of the published books were sent to museums, collectors, schools, and libraries.<sup>[6]</sup>

"open your eyes" is Albers' motto from the beginning of his teaching career, and it also pervades this book. For him, teaching art is not about teaching techniques and styles, but about giving students a clear understanding of the world as they see it. He believes that the first thing to face in art work is the visual world, and the first thing an artist should do is to see the world with his own eyes. Therefore, the eye is a tool that we must sharpen in various ways.

Albers' color theory influenced Kenneth Nolan, who went to Black Mountain College to study, and he was a prominent representative of the color gamut school that emerged in the United States in the 1950s. One of his students, Robert Rauschenberg, called Albers "America's greatest disciplinarian," and inspired by his color lessons, Rauschenberg created paintings with color themes such as *White Painting*, *Black Painting*, and *Red Painting*. At the same time, Rauschenberg is one of the most successful artists who inherited and developed the experimental spirit of Black Mountain College. Albers' wife Anne's use of everyday materials, as well as the interdisciplinary experiments of John Cage and Merce Cunningham, have impressed him throughout his artistic career. In 1984, Beuys was influenced by Albers to paint a series of color blocks on grey cardboard, including *Center Red* and *Center Yellow*, now in the Tate Gallery in London, England.

At the same time, the translation and publication of the *Interaction of Colors* has played a positive role in the reform and development of Chinese art education. It has been widely used in the course of design color composition in art colleges, which has certain beneficial reference significance and ideological enlightenment for art educators to carry out theoretical research and teaching practice.

### ***2.3.1. Color juxtaposition relationship content***

In our perception, the process of color change is affected by two factors: one is the light and the other is the tone. This color interaction is present to a greater or lesser extent in all color combinations, but in most cases it is unrecognizable even to the trained eye and requires color training to discriminate. This interaction makes the same colors look different, different colors look similar, and even the defined shape and color regions disappear. For example, the opaque color looks transparent, the heavy color becomes lighter, the colorless neutral color becomes colored, the warm color becomes cold, the heavy color becomes lighter, and vice versa. While other factors can also affect the psychological effects of color, such as location, shape, quantity, and reproduction, the phenomenon of color caused by juxtaposition is one of Albers' main concerns in the book *The Interplay of Colors*.

Albers wants to express the concept of color in the chapters from *Relativity of Color* to *Fading of Color* in order to seek harmony of color, it is necessary to seek color difference. In terms of tone, for

example, a strong looking red pushes its neighbors toward green, which is its opposite hue. This effect can be understood in two ways. First, on the basis of color superposition, any hue will superimpose its complementary hue onto its neighboring hue. Secondly, it is a subtractive effect of color, absorbing the hue or light from the original hue of the color, emphasizing the various elements and conditions in the color contrast. For example, in a classroom practice that requires the whole class to complete the same task, find two different colors in the colored paper to make them look similar. But Albers doesn't tell students what to do, he just shows a challenging example. When placed on two different colors of colored paper as a background, the deep tones of green brown and high profile white yellow can look similar. Each student's task was to choose a few other colors with different hues, then find a pair of different background colors, look at the colors and ask: What makes the dark brown less dark? What kind of background makes us ignore the yellow and white of color? Students will find compelling answers through practice, and by learning together, they learn to compare themselves with others and gain the general experience that only comparison leads to evaluation.

### **2.3.2. Media selection and processing**

Albers pointed out in the chapter "Reasons for using colored paper" that colored paper materials can provide a variety of shades and shades of color. And colored paper is cheap and easy to collect. First of all, avoid unnecessary pigment blending work; Second, students do not have to face the situation of repeated color mixing failure, save time and materials, and maintain an active interest in color exploration; Third, color paper is easy to reuse the same color, there will be no changes in tone, brightness or surface quality, and there will be no uneven thickness changes due to the use of different pigments; Fourth, the tools and equipment needed to process pigments can be eliminated; Fifth, color paper can avoid excess impurity lines, avoid poor color perception, thereby reducing the sensitivity of color processing. Most importantly, when using colored paper, students can quickly and accurately find the most appropriate color to present the ideal effect, which provides training opportunities that the color palette cannot provide.<sup>[7]</sup> There are few materials and variations in Albers' color class: colored patterns, rubber adhesives, scissors, razors, blades, cutting boards and cardboard to complete research. He would briefly introduce the exercises, then hand out the materials to the students and observe their work. Albers encouraged students to use the raw nature of the material for classroom experiments. Albers believes that the success of artistic practice is based on the combination of materials and direct experience.

### **2.3.3. Color optical illusion**

The chapter "Colors Can Deceive" describes the human visual system through optical illusions, revealing our knowledge of the visual system. In this chapter, Albers shows some color illusions that represent different mechanisms of our visual system. The visual process starts from the eye and continues to the brain, and then a series of physiological mechanisms occur, such as afterimage, color assimilation and contrast, as well as the mixed light effect of the Bebold effect, these phenomena allow students to learn new aesthetic experience and visual insight.

In a classroom exercise on visual perception deception called "Cross Colors," Albers had students place light, medium, and dark red paper together and partially overlap them. Students need to move the darkest piece of paper to the right so that it slowly reveals more medium red colored paper in the center. If you carefully observe the red color in the middle of this process, it will produce an optical illusion; The color of one edge of the medium red paper will be lighter, and the color of the other edge will be darker, taking on the characteristics of its neighboring color. While common sense tells us that paper can't possibly change color, our brains show otherwise. Such experiments have made great strides in improving understanding of how the brain interprets information received from the eye.

## **3. Analysis of the present situation of high school art color teaching**

### **3.1. Present situation of art color teaching concept**

John Dewey, a famous American educator, once said that the history of education is like a testing ground for educational science. This phrase can also be used to describe the close connection between art education and fine arts education. In China's current art education, most of the teaching methods of aesthetic education in middle schools are realized through learning skills, which is easy to make students become only skilled rather than creative "craftsmen".<sup>[8]</sup> The art course in ordinary high school is a compulsory course of art learning and an important part of high school education and teaching.<sup>[9]</sup>

The color teaching course in China has experienced a long development process from the drawing

class with pragmatic color to the attention paid to the basic aesthetic function of color. A comprehensive review of the development of education history will play a positive role in promoting the development of color teaching in our country. In this chapter, the author compares the structure of the curriculum standard from 2003 to 2017, helps to think from the starting point, more clearly understand the change of color teaching, and lays a foundation for explaining the status quo of color teaching. This paper focuses on the data composition analysis of the color module in the 2019 edition of high school art textbooks, explores how Albers' color teaching concept is involved in the current high school art color curriculum, selects and organizes teaching content according to the law of students' cognitive development and takes the core quality of fine arts as the key line, carries out three-dimensional course teaching, and improves the teaching quality of color courses. It has laid a solid theoretical basis for deepening the teaching of art color course.

### 3.2. Changes in color modules from 2003 to 2017

Table 1: 2003 edition and 2017 edition of the curriculum curriculum set table.

Programme document	Learning module	Organization module	Class schedule
High School Art Curriculum Standards (Experiment)	Art appreciation Painting and Sculpture Design and process Calligraphy and seal cutting Modern media art	1. Credit management system: The course selection strategy of "1+2" is adopted in 2.3 base credits	54 class hours / 1 class is divided into 18 class hours, and the semester task requires 3 credits
Art Curriculum Standards for Senior High Schools (2017 edition)	Required: Art appreciation	Teaching can be organized in the form of class, cross-class or cross-grade	One credit of 18 credit hours, 3 credits of study and elective/teaching arrangements are arranged in the first or second semester of the first academic year
	Optional: Painting Chinese painting and calligraphy sculpture design technology Modern media art Foundation of art history theory	Depending on the modules offered by the school, students study two of them (or one of them consecutively).	It is scheduled for the second semester of the first academic year, the first or second semester of the second academic year, and the first semester of the third academic year
	Elective Courses: Basics of sketch Sketch basis Color basis Fundamentals of creation and design	According to the unified arrangement of the school and students' wishes, cross-class or cross-grade teaching organization is adopted	It can be placed in any semester of high school depending on the situation

By comparing the course structure of the two editions of curriculum standards, Table 1 shows that the content of modules has increased from 5 modules to 12 modules in terms of the nature of the course and the classification of the learning series, and the classification is clear and the class time arrangement is more detailed, which further conforms to the compilation concept of the course standards which is epochal, basic and selective. At that time, there were also disputes about the nature of color curriculum in the course of curriculum standard development. The color module is not placed in the same position as the other modules, but is integrated into each required course content. For example, the high school art course has developed concepts, comprehensive materials, colors and techniques in art practice activities, and added color skills, color appreciation methods and comprehensive material modeling contents in the learning module of "Painting and sculpture", so as to feel and understand the phenomena of cold and warm colors, light and dark colors, as well as the emptiness and reality of space form. Drawing skills are learned through the use of knowledge of proportion, composition, shading, perspective and color, thereby introducing modern art concepts and environmental awareness, reflecting the latest developments in the fine arts discipline. But color learning is more often seen as a skill method for students to draw.

The 2017 version of the curriculum standard has improved the previous curriculum structure, involving compulsory, optional compulsory and elective content, and has more freedom in the arrangement of class hours and more courses for students to choose. Color becomes a separate module, and pays more attention to the cultivation of color basis. The condensed color standard in the 2017 version of the lesson standard requires more concrete, and the "painting" learning module uses basic color language and materials to describe things and express their subjective ideas. While mastering color

skills, the "Color Foundation" module requires students to show a certain amount of imagination and creativity, show a certain degree of thought and high aesthetic taste, and recognize the social attributes of color and the relationship between color performance and cultural views and aesthetic standards.

At the same time to increase the emphasis on traditional Chinese art, "Chinese calligraphy and painting" requires students to distinguish between Chinese painting color, ink and other forms, feel the charm of traditional Chinese calligraphy and painting art. New artistic media are constantly emerging, and "modern media art" analyzes photography or digital paintings based on light, color and composition, thereby using modern instruments to express one's feelings.

It can be seen that the color module extends to the aspects of color composition, modeling language, composition form, material synthesis, drawing imagination, concept change, ideology, appreciation and aesthetics. The contrast between the two versions of the connotation of academic quality is more clear, and the change from skills to concepts can also show that China attaches more importance to the development of students' informed integration. The new era endows color teaching with new connotation and diverges students' artistic thinking mode.

#### 4. Teaching design based on Albers' color teaching theory

The teaching design content of this course mainly includes the basic concept of color appreciation course, color interactive situation creation course, a total of four hours. The class is divided into five key links: introduction, teaching new lessons, practice, evaluation and homework. The art elective color course offered in the second year of high school is different from the compulsory art appreciation course in the first year of high school. The author controls the teaching theory content within 20 minutes. The teaching process of the whole class follows the educational principle of "student-centered", and adjusts the teaching of color theory knowledge in one class according to the specific teaching reality, so that students' understanding is the first goal of the class. The teaching method is based on intuitive perception, and any knowledge point is supplemented by a large number of pictures and videos.

This teaching mode is mainly aimed at color as one of the important contents of visual art education. This course emphasizes the experience and understanding of visual art media, techniques, structures and processes, and advocates free choice and creative application. For humans, vision is a sense for perceiving the external world, and it is also the most important of the five senses. If the traditional creation method is combined with the modern creation concept, it can not only give the art creation new vitality, but also make the art work not only have the external beauty, but also have the connotation. Postmodernism advocates the transformation of life experience into visual culture. Therefore, the teaching focus should be shifted from skill training or media cognition to the relationship between living environment and visual art education.

1)"Color interaction" instructional design

Teaching time: June 28, 2022 /1 class hour

Teaching object: students of Art Class 1, Grade 2, XS Middle School

Teaching objectives:

Knowledge and skill goal: Through the color difference, similarity, contrast color characteristics, logic teaching to understand the scientific law of color interaction and color aesthetic knowledge. Through systematic classroom exercises, students can have a scientific cognition of color and creatively apply color in practice.

Process and method: Through the study of the basic theory of color composition, master the law of color in the relationship of composition, so as to understand the role and purpose of color composition.

Emotional attitude and values: Make students take the perceptual effect of color as the starting point, make full use of the law of the unity of science and formal beauty, make full use of people's subjective initiative and abstract thinking ability, and lay a good foundation for the study of the main course of design major.

Teaching focus: understand the nature of color optical illusion and relativity, understand the principle of color deception, and train students' ability to observe color.


Difficulty in teaching: Use and recognize color properties in real life.

Teaching methods: situation creation method, teaching method, demonstration method, practice

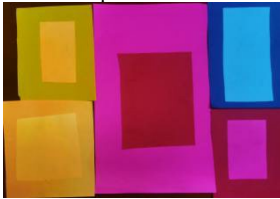
method.

Teaching preparation: teaching courseware, colored paper, scissors, solid glue, etc.

Table 2: "The Interaction of Colors" lesson plan.

Teaching link	Teacher activity	Student activity	Teaching objective
Classroom introduction	<p>Introduction before class: The ear will hear, the eye will see wrong (such as chopsticks in water refraction is curved), in fact, our perception tells us that it is straight, the brain's cognition is limited, the world we see is not the world as it is, is captured by the eye light elements back to the brain and then imaging, forming our world. It is often impossible to recognize a thing (substance) through smell and touch. You have to judge by your five senses. Topic: color error effect Let's start with the concept of color error effect. Strong color contrast makes the same color appear different feelings. In the student's homework, the color of the upper and lower two light blue areas is not the same, (the bottom is dark and the top is light), but when the band on the right is pulled apart, it proves that the light blue in the middle is the same color.</p>	<p>The introduction of theory allows students to feel the difference between the actual situation and the psychological effect.</p>	<p>Color is the most relative medium in art. Understand the principle of color relativity and allow students to perceive the concept of color error vision.</p>
Classroom development	<p>Theoretical guidance Practical links: It is required to put two small rectangles of the same color and the same size on the background color of a large area with great differences. Question: Find out which colors are easily affected by ambient colors, and which colors are difficult to change? Conclusion: 1. Color change comes from influence. (Ambient light intensity, surrounding contrast color, tone and other factors) 2. color has many facets, we can make a color look like two different colors. 3. When the vision is confused, we can pick up the paper and verify that the square and the bottom are the same color. Extended example Platinum - blue black case: Let the students judge first, then explain why. Explain why: Everything we see visually is processed by our brains. The color of light reflected by an object is not only related to the color of the object itself, but also to the color of the light itself.</p>	<p>Students are encouraged to constantly compare and observe colors, and use trial and error to conduct research, so that students can realize that discovery and creation are the standards of creativity. Student classroom practice:</p> 	<p>The teacher guided the students to understand the factors of color difference and the principle of optical illusion with colored paper comparison experiment. Understand the causes of color changes, through the network pictures for example, color in life will be affected by environmental light, tone, color temperature, hue and other factors, exercise students' eyesight.</p>



	<p>Teaching new courses: Color contrast, color interaction Factors that affect color: hue and brightness Repeating similar experiments with similar colors shows that any base color will subtract its own hue from the color, which will have an effect. The influence of ambient color. Students practice: Please find different shades of light and dark in the colored paper. The bright paper is placed on the brighter background color, and the dark color is placed on the darker background color. Tell me what you found? Experimental conclusion: This experiment proves that the brightness of the background color decreases in the same way as the hue. It can be seen that if the base color is not visually reduced by the same amount, then any transformation of the color in tone and light and shade relationship will be reduced.</p>	<p>When two or more colors are juxtaposed in the same picture, both sides of the juxtaposing will push each other towards their complementary colors; In the same hue, colors placed in a complementary color look more vibrant. There are many more examples in life. Like leaves in different light. It is also due to the influence of neighboring colors that one color looks like two colors. Classroom practice: </p>	<p>Understand the similarity of colors, put the visual focus on the center, highlight the problem that the visual contrast color is too deep and too light, and let students try to play with colors.</p>
	<p>Theoretical guidance: Color contrast includes simultaneous contrast, continuous contrast, three elements of color: hue, purity, brightness contrast, color assimilation and application in life. Color illusion includes color mixing, a visual optical effect, and the application of the Bebold effect. Color is deceptive - afterimage, contrast at the same time Additional visual training to enhance the phenomenon of optical illusion.</p>	<p>The effect of spatial mixing depends on three aspects: 1. The texture of the color shape, using the basic shape of juxtaposition, to arrange the orderly effect. 2. The intensity and contrast between the juxtaposition colors are strong, and the space mixing effect is not obvious; 3. The distance of the viewer, the picture produced by space mixing, the color points are clear when viewed closely. Among them, the pointillism works of Impressionist painter Seurat are a model of painting using the principle of space mixing. Afterimage phenomenon: 1. Complementary colors appear 2. Contrast inversion of residual image, residual shape, etc. The reason of the afterimage is that the nerve endings of human retina (rod and cone) can adjust and receive any three primary colors, afterimages or simultaneous contrast, which is a psychological and physiological phenomenon.</p>	<p>Let students understand the basic laws and factors of color interaction and understand the different expressive forces of color. The combination of the law of the beauty of the composition of color and the elements of the composition of the practice process to understand the change of the form of color illusion.</p>
<p>Evaluation reflection</p>	<p>Based on activity process and trial and error method, teachers guide students how to distinguish color optical illusion in life and produce cognitive changes.</p>		
<p>After-school extension</p>	<p>Extension map shape illusion: Ebbinghaus illusion -Space: The concept of shape optical illusion, B.C. optical illusion art works, how we use color and shape optical illusion in life, such as software design, food collocation, etc., to reasonably express design concepts and reflect functional services.</p>		

Teaching evaluation:

In Table 2, the concept of color interaction is a difficult course for high school students to accept, which requires students to overturn the traditional book curriculum and expand the limitations of students' cognition of conventional color techniques. Its purpose is to guide students to analyze, process, integrate and re-understand the reciprocity of colors by scientific and reasonable collection of image information based on life experience and modern equipment technical means. In the process of problem solving by means of trial and error, students are put into meaningful problem situations and become active thinkers. This course is originally a college design course, and now it is taught in the first volume

of senior two. According to the law of physical and mental development of senior high school students, the author takes simple creativity, design methods and basic production skills as the starting point, without setting too much theoretical knowledge or professional terms.

The afterimage experiments in this lesson prove that people with normal vision cannot escape the deception of color. This example warns students to treat anything honestly, to think in their minds and prove it through practice, and not to make conclusions about things easily with intuitive feelings and there is no absolute in everything. The lesson revolves around the idea that the important task of the human visual system is to convert the light signals it receives into meaningful components, and thus to determine the nature of the objects in the image - consciousness changes our perception.

## 5. Conclusions

This paper combines the educational idea of Albers' color teaching book "The Interaction of Colors" with the teaching of high school art courses to explore a new teaching mode.

With the cultural connotation of modernism as the core and the perception of historical literature and art creation as the theme, it carries out teaching activities such as visual literacy and cultural interpretation, aesthetic appreciation, painting design and work production.

In the classroom, students explore the properties of color materials and tease out the connections between interdisciplinary culture, art and life. In the setting of the key and difficult points of the course, this course establishes the cross-connection between art and psychology, science, mathematics, logic and other disciplines, and organically integrates art and science. In class, students carry out activities such as emotion expression, material exploration, image aesthetics, graphic transformation, image processing, and work design, so as to improve their hands-on ability, critical thinking ability, learning and innovation ability, and further develop their individual comprehensive quality.

From the perspective of art, art is the crystallization of intellectual creation. The main task of studying art is to explore the interplay between art, the mind and the world. This paper analyzes Albers' artistic concept from the perspective of his creative ideas, styles, techniques, media and aesthetic qualities, all of which contain the power of autonomy, which has been creating a creative and interactive relationship with science, thought, nature or the world. When students can understand the intellectual ideas and technical means of art, they can better understand and use art.

Through a series of courses, students have learned about the relationship between color and art. Through a series of courses, students have had a preliminary understanding of the blending point between color and life, and can draw on these color phenomena to show their practical ideas, and transform creative ideas into visual images through color expression on paper or canvas, which can serve as the basis for creation. Create excellent paintings and understand the impact of color on life.

At the same time, students have exercised their communication, expression and cooperation abilities in teamwork and group exploration. Through personal experience, they have developed a focused and responsible attitude towards work and enhanced their sense of social responsibility.

The basic goal of Albers' color teaching: observation and expression. Albers emphasized that The Interplay of Colors is a report on the logical sequence of classroom exercises. The purpose of color learning is to achieve free application, rather than regard color as an ordinary means of tracing. The color teaching introduced to China by Bauhaus research through Japan at that time has a systematic style in teaching. But it must not be forgotten that the purpose of color teaching is to encourage students to distinguish the different feelings of color in different relationships through experiment and research, observation and discovery. Therefore, in today's basic art teaching, color training on the one hand needs to thoroughly sort out the context of color research and teaching in the history of aesthetic education, on the other hand needs to be combined with the current development of aesthetic education, on this basis to broaden and extend.

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