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Japan Advanced Institute of Science and Technology

Learning Support for Chinese Children in Painting Practical Creative Behavior

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Japan Advanced Institute of Science and Technology

Doctoral Dissertation

Learning Support for Chinese Children in Painting Practical Creative Behavior

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Abstract

Children's paintings can clearly show children's aesthetic tendencies and technical creative ability. Children's painting perception and fine arts teachers' guidance have played a decisive role in children's painting achievements in the process of children's painting creation. The basis for children to learn painting is to learn to combine lines, graphics, space, and color into a complete painting in accordance with certain rules. In painting work, the control ability of painting learners to lines, graphics, space, and color represents the painting ability of painting learners. Children's technical ability to paint and children's creativity determine the visual effects of their paintings. Children's painting technical ability is related to children's understanding of painting knowledge and children's daily painting practice. In the process of children's painting teaching, using appropriate teaching methods to guide children effectively is the key to improve children's painting level. The creativity of children determines the quality of their paintings. Therefore, improving children's practical creative level is a very important part of painting education. Children need to learn painting through the painting knowledge and materials knowledge provided by fine arts teachers combined with teachers' explanations. Children's practical creative abilities can be shown in their paintings. For primary school students in China, their practice of painting is achieved through school fine arts courses. This study takes Chinese children as the research object. This study also provides Chinese primary school students with support for painting learning by different research contents. This study will be divided into three parts to test the impact of children's technical expressiveness on painting learning. The subjects of these three parts were children aged 7-13. The first part of the test mainly uses the questionnaire survey to test the children's painting learning. The questionnaire was used to study the relationship between the development of children's painting cognition and the achievements of painting. At the same time, the relationship between children's creative behavior and family, school, and painting materials was verified

through questionnaire tests. The second part mainly uses questionnaires to study children's learning motivation for painting. The third part of the test is the graphic test. This part mainly studies children's mastery of painting knowledge and skills by testing children's image recognition ability, object observation ability, and painting ability. In this part, the characteristics of children's painting ability at different ages are also summarized.

Keywords: children's painting learning; children's creative behavior; children's painting ability; children's painting education; practical creative behavior

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Chapter 1: Introduction of This Study

Children's painting creation behavior is determined by children's painting creativity. This research is mainly to study the methods to improve children's painting creativity behavior by testing children's painting learning abilities, children's painting learning motivation and painting learning characteristics. The essence of fine arts education is to cultivate students' artistic creativity, artistic perception and aesthetic ability (Wang, D. G., 2014). Different from professional fine arts education, the focus of children's fine arts education is to cultivate children's art perception ability. Cultivating children's artistic appreciation ability in the process of children's learning painting can help children improve the cognition of painting. The process of children's fine arts education is a process to help children acquire aesthetic ability, artistic cognition, creativity and artistic appreciation (Eratay, E., 2017). Children's artistic cognition is achieved in the process of acquiring painting skills and understanding fine arts knowledge. Therefore, the guidance method for art teachers to children is that teaching methods determine children's fine arts learning results.

Every children have the instinct of painting. Children's drawing is based on their daily experience and drawing experience (Yang, J. Z., 2016). The significance of children's fine arts education is helping children transform their painting experience to painting behavior. Painting training can help children better observe and understand things around them. It can also help children think rationally about their relationship to the environment in which they live (Berksoy Taşdan. A, et al., 2018 & Chordnork, B., et al, 2018). Fine arts education can help children better perceive changes in the environment in which they live. Therefore, children's art learning process also helps children to establish their aesthetic emotions with nature. Art works are created based on human emotional experience, and at the same time provide a way for people to communicate with the outside world. The process of children's painting creation is also the process of children's self-expression (Golomb, C., 2003). Children's paintings can

also help fine arts teachers better understand children's aesthetic abilities.

Children's artistic behavior are formed in the process of continuous reconstruction and development of art learning. The relationship between children's growth track and their living environment were showed in children's paintings (Nelson, B., et al., 2007). Also, painting is also one of the ways of children's to express themselves. What children's painting education emphasizes is to provide guidance on the deficiencies in children's painting techniques without changing the creative ideas of children. Children's painting creative guidance is not a teacher's completely non-intervention painting teaching for children(Rubenstein, L. D. V., et al., 2018). Painting learning with creative goals can help children improve the behavior of painting. Teachers need to help children set some creative ranges in the process of children's learning to paint. For example, teachers limit the theme of children's paintings, but children can freely create paintings from the aspects of painting expression, color, composition, materials, etc. Under the premise of these established painting rules, teachers can more accurately find out children's problems in painting creation. Also, teachers help children find out the lack of application of painting skills. The premise of fine arts teachers in guiding children's painting creation is to master the learning situation of children's painting. Analyze the problems of children of different ages in the process of painting creation. Through the children's painting works, fine arts teachers can the information about children's painting interests, painting habits, and painting skills. Teachers should combine children's age characteristics and understanding ability to provide some painting knowledge for children of different ages. And guide children to apply appropriate painting techniques for different styles of creation in the process of painting creation.

The paintings reflect the life attitude and aesthetic attitude of the creator. Paintings are presented in the form of images. Image base knowledge is more intuitive than literally knowledge to help people convey knowledge. Also, the image base knowledge

is easier to understand than the literally knowledge. When people evaluate a painting work, people will evaluate from the emotional expression and the layout of the painting work. The process of artistic evaluation is from whole to partial (Francuz, P. J., et al., 2020). When people evaluate works of art, they also acquire the knowledge that people need from the works of art, such as the background of the creation of the work of art, the cultural background contained in the work of art, the constituent elements of the work of art, and the process of creating the work of art. Therefore, people's evaluation of art works is also one of the ways for people to learn about fine arts. Similarly, children learn new painting skills from understanding to practice. Therefore, the process of learning fine arts is a process from overall cognitive learning to supplementary learning.

Children prefer to put their ideas and emotions into their paintings (Yang, J. Z., 2018). Although emotional expression is an indispensable part of painting creation, painting techniques and materials are the prerequisites to help children achieve painting creation. In a painting, the composition of the work, the arrangement of objects in the painting, and the painting style are all important factors that constitute the integrity of the painting (Jolley, R. P., 2009). The application of painting materials and the color matching in images are important factors that constitute the overall features of painting works. In the process of art learning, middle school students should first establish the overall cognition of aesthetic objects (Soh, K., 2017). Then improve the artistic effect of painting works through painting techniques. Cultivating children's overall and partial awareness of painting can help children improve their expressiveness in the painting.

Children's artistic creativity is not only derived from children's talents for art, but also needs to rely on children's continuous practice to paint (Beghetto, R. A., 2007). Painting is one of the ways to show the living environment and cultural environment (Gutiérrez, K. D., et al., 2003), and it is also the process by which people reproduce the living environment and cultural environment. Therefore, the study of art appreciation and painting creation should be connected with real life. In the process of fine arts

learning, it is more important to experience the artistic characteristics of art works than to learn objective art knowledge directly. The process of children learning art knowledge is also the process of experiencing art (Kangas, M., 2010). Children acquire painting skills and knowledge through continuous painting practice and art appreciation. Painting creation can also help children find ways to communicate and express with others. The experiential painting learning can also help children better understand painting knowledge.

Different from adults, children's comprehension and cognition are lower than adults (Golomb, C., 2003). If a lot of painting terminology and professional painting theories are used in children's painting courses, it will increase the difficulty for children to learn to draw and thus reduce children's learning interest. With the help of image knowledge and creation of art education activities, fine arts teachers can help children better complete painting learning. In the teaching of children's art, using the content of images to guide children to understand the artistic knowledge conveyed by images can more effectively help children understand the theoretical knowledge of art. Involving children in art education activities created by art teachers can also increase children's interest in learning art. Guide children to participate in the operation and observation of painting experience activities in class to help children better apply painting techniques. As a guide of fine arts teaching, fine arts teachers influence the effect of children's painting learning.

The effective guidance of fine arts teachers can help children better understand and apply painting knowledge. The quality of children's paintings is directly determined by the teaching methods and guiding methods of fine arts teachers (Li, S. K., 2018). The task of fine arts teachers in children's painting learning is to train children complete paintings independently and improve children's artistic creativity through painting trainings (such as sketch training, color training, sculpting training). The setting of art teachers 'teaching content, the way teachers guide children to learn, and the teachers'

teaching methods all affect children's interest in learning painting. The core of children's fine arts education is to cultivate children's creative ability and assist children to show their individual artistic traditions in painting creation (Krueger, J., 2014). Children of different ages also have differences in their painting habits and painting behaviors. Fine arts teachers understand children's painting habits and children's painting ability can help children learn painting creation more effectively. Also, teachers' evaluation of children's paintings will also affect children's painting learning (Beghetto, R. A., 2005). Both positive and negative evaluations will affect children's learning motivation (Judson, E., 2014). The fine arts teacher should point out the advantages and problems of children's paintings by combining the ordinary painting performance of each child and the children's original painting ability (Gu, T., 2018). Make suggestions for improvement based on children's painting ability. The purpose of children's fine arts education is to help children improve their artistic aesthetic abilities and artistic creation abilities. The content of fine arts teaching should be a teaching plan based on the creative behaviors of different children. The teaching content of children's fine arts education is changeable and targeted.

1.1. Background

Children's psychological status and children's painting ability determine children's painting technical creativity. The features of children's paintings represent the children's daily observation concerns. Children's ability to perceive things also affects children's expressiveness in painting. The traditional method of improving painting skills is generally achieved by replicating other people's paintings (Qin, H., 2018). But it is very difficult for most painting learners to perfectly reproduce the paintings of others. The significance of painting replicate training to students is to help students feel the process of painting creation. It is more important for children to understand the process and method of painting creation than to guide children to train painting skills (Craft, A.,

2006). Therefore, the teacher's guidance on children's painting will affect children's painting learning. The process of instructing students who are over 15 years of age in painting creation is the process in which teachers assist students to properly combine the lines, colors, and composition in the painting. But for students under the age of 15, the interest of children in painting learning can help children better participate in painting training courses. In the stage of basic knowledge learning, cultivating children's correct learning habits of fine arts can help children improve their creative expression of painting. Therefore, children's feelings for painting creation, children's interest in painting learning, and children's participation in painting courses will affect children's painting practical creativity.

The features of children's paintings change as children grow up. The development process of children's painting creation is from the simplification of the object's shape to the complexity of the shape (Rubenstein, L. D. V, et al., 2018). The contents of children's paintings have undergone three stages of development: rough sketch, realism and abstraction (Krueger, J., 2014). For younger children, when they first started painting, they were less expressive (Nelson, B., et al., 2007). Therefore, their paintings show the characteristics of simple object shapes, lack of detailed description of objects, and most of the objects in the image are composed of lines. With the development of children's cognitive ability and continuous painting practice, children began to try to use different painting materials to express different painting styles. In the process of daily painting training, children learn how to observe objects and how to express the details of objects. Their works have the characteristics of realism, clear theme and rich image content. The children in the third stage started to try to abstract some parts of the painting after they had mastered certain painting techniques. Children at this stage advocate creating works that represent individual painting styles. In order to highlight their creative experience, these children will abstract the composition of the painting, the shapes and colors of the objects in the painting. Children's behavior in painting

changes with the improvement of their painting ability. And children's behavior in painting is also related to children's cognitive ability (Sawyer, R. K., 2006). Therefore, according to the cognitive development characteristics and drawing abilities of children of different ages, painting education and guidance for children can help children improve their behavior in painting.

The cultivation of children's artistic behavior is also the cultivation of children's artistic perception. The creation of paintings needs to be completed with the cooperation of various human abilities (such as visual sense, auditory sense, and the sense of smell). When children use painting to express the features of an object, they need to first perceive the appearance features of the shape, volume, color, and position (cognition of space) of the object. Then children combine these perceptual experiences to create paintings. Children's spatial perception, color perception and shape perception are all related to implicit cognition (Rojas-Drummond, et al., 2006). Children's implicit cognition is related to their life experience and the experience accumulated during the learning process (Fomichov, V. A., et al., 2019). As children learn new knowledge, children's implicit cognition can help children understand what they want to learn. Therefore, children's painting education is also a process that helps children stimulate their implicit cognition (Huang, C., 2019). The creative cognition involved in the painting is more than the rational cognition of the creator. When children create paintings, they first consider the overall characteristics of what they want to express. The process of painting creation is also a process from whole to partial. In some children's paintings with lower behavior, children's ability to express the characteristics and details of painted objects is generally insufficient. These children are often not good at analyzing and summarizing the characteristics of objects. Children's ability to observe and summarize things also affects children's behavior in painting. In the process of children's painting education, through observing and training objects, children can improve their shape perception, space perception and color perception. Children's

learning of painting is related to the cultivation of children's cognitive ability. Fine arts teachers can achieve well teaching results only by cultivating children's painting cognition and creative consciousness.

1.2. Study Purposes

Painting education is one of the ways to cultivate children's creativity. The importance of painting training to children is not limited to developing children's painting skills, but also fostering children's creative thinking. Children can learn different styles of artworks in the process of learning to paint. Different types of art forms can inspire children's creative inspiration. When children create paintings, the control of children's color, the depiction of object features, the relationship between space and object position are all factors that affect children's painting expression (Yang, J. Z., 2016). Restricted by cognitive abilities, children have a poor understanding of professional painting concepts. Images can show the information of things intuitively and image information is also the most easily obtained by people. Fine arts teachers can use the image contents to teach painting in the process of fine arts education according to the characteristics of the images. Teaching methods that use images instead of words can better help children understand what they want to learn. Therefore, the purpose of this thesis is to design some educational methods to transform professional painting knowledge and concepts into graphic content that children can understand to help children better understand the knowledge related to painting creation and help children improve the behavior of painting creation. Graphical information is easier for children to understand and learn (Cassotti, M.et al., 2016). Therefore, in this research, there are some image questions and answers combined with painting techniques. These quiz questions can help art teachers quickly understand children's painting ability. At the same time, through these image tests, the cognitive characteristics of children of different ages can be analyzed.

Fine arts courses are a way to help children improve their aesthetic and creative abilities. Effective painting teaching methods can help fine arts teachers get better teaching results. The importance of fine arts education is assisting children to acquire the knowledge of painting techniques and cultivate children's artistic cognition. Fine arts teachers play a guiding role in children's fine arts learning. This research mainly studies children's painting behavior and children's painting ability. Studying the painting learning situation and learning characteristics of children of different ages can provide different guidance strategies for fine arts teachers. These research results can also help teachers provide more targeted guidance for children of different ages, different painting habits and different painting abilities based on the test results. Also, fine arts teachers help children increase their interest in art learning based on test results. The teaching effect of fine arts teachers can be shown in children's paintings. Teachers, as guides for children's fine arts learning, can help students improve their ability to create paintings if they understand the strengths and weaknesses of children's works. By analyzing children's artistic cognition through children's paintings, find out what factors determine children's artistic cognition. In the process of fine arts teachers teaching painting, teachers can formulate teaching content more suitable for children according to the characteristics of different children's perception of painting, and effectively help children cultivate innovative thinking. When fine arts teachers guide students to create paintings, their attitude towards children also affects children's learning outcomes. Teachers' evaluation of children's works can help children improve their painting skills and form well painting habits. This study tested the influence of children's attitude towards from fine arts teachers. Also, testing teachers' evaluation on children's painting learning. These tests can help teachers understand whether their teaching methods are appropriate. At the same time, teachers can adjust teaching content and teaching methods according to the test results.

The result of children's learning is the result of school education and family

education. Children's living environment and learning environment will affect children's painting behavior. And children's emotional changes under the influence of the external environment will also be reflected in children's paintings. Children's paintings are the form that most directly reflects children's cognition. Parents of children can understand their children's emotions and thoughts through their children's paintings. In this study, a questionnaire survey was conducted on children's creation of paintings at home. According to the results of the questionnaire, fine arts teachers can learn more about children's learning outside the classroom. And the teaching plan can be adjusted appropriately according to the test results. For children's parents, these test results can help parents better understand their children's painting learning. Parents' attitude towards children's learning to draw will also affect children's behavior in painting. Therefore, children's parents' attitudes towards children's learning to paint were tested in this study. The questionnaire was tested from five aspects: parents' investment in children's painting learning, attention, companionship, understanding and expectation. At the same time, fine art teachers provide targeted instruction for students in different learning environments through the situation of children learning painting at home.

1.3. Methods

This study will use questionnaires and case analysis to research. The questionnaires were used for both the children's painting learning test and the children's painting ability test. And the questionnaire data used in the study are all research data obtained through primary school fine arts class to collect questionnaires. The questionnaire tested in this study is mainly composed of structured questionnaires and unstructured questionnaires. The structured questionnaire is mainly about children's attitudes towards in painting learning. To ensure the authenticity of the questionnaire data, all children participating in the test completed the questionnaire filling task

independently without any prompts or guidance. The structured questionnaire in this study is mainly to test the impact of children's gender, age, drawing ability and learning ability on children's painting behavior. The unstructured questionnaire mainly uses some image questions with professional painting knowledge. These questionnaires are designed to test children's mastery of painting techniques and painting expertise. The child first analyzes the painting knowledge represented by the images in the problem, and then selects the image most similar to the problem from the options of the problem. Through the test data of image question and answer, this paper analyzes the difficulties of children of different ages and genders in painting learning. And based on the results of data analysis, find out which painting knowledge and techniques cannot be used by children in painting creation. Finally, the results of all the analysis provide some painting teaching solutions to help children solve the problems in the learning of painting techniques.

This study is mainly to help children improve their behaviors in painting creation. When analyzing children's painting learning results and the painting features of children of different ages, it is still necessary to use different types of children's painting works as analysis samples and combine other data to analyze children's painting performance characteristics. Therefore, for some representative children's paintings, this study will use case analysis to analyze these paintings. The analysis of children's paintings is mainly based on the colors, compositions, lines, themes, materials and styles in children's paintings. Therefore, when selecting a sample of analysis cases, it is also based on the above aspects. At the same time, some paintings with representative features, especially in one of the above aspects, will be selected as samples for analysis. These paintings used for case analysis are all from children's daily practice. The reason why children's daily painting works are selected as analysis samples is because children's daily works can most truly reflect children's painting abilities. The deficiencies in children's painting creation can also be more clearly understood through

children's daily painting works. In addition, in order to compare the impact of different teaching methods on children's painting behavior, in this study, children's painting works will be used as a case analysis sample to compare and analyze children's painting behaviors in different teaching methods. Through comparative analysis, find out the painting teaching methods that are more suitable for children of different ages and different painting learning abilities.

1.4. Importance Between This Study and Adults Practical Creative Behavior

The practical creation behavior of adults is composed of their painting ability and aesthetic ability. People acquire painting and aesthetic abilities from professional fine arts courses. In the process of practical creations, people's early stages of the fine arts learning process played a role in promoting people's future artistic creation (Nagai, Y., 2016). Children's fine arts curriculum education is the earliest way for people to systematically understand and learn art creation. The importance of children's fine arts curriculum education is not only to train children's ability to create paintings, but it also provides a foundation for people's future artistic creation. Children can acquire painting skills from the training of the color matching, observing objects, composition, perspective, and the application of painting materials in fine arts courses. These contents are the foundation of artistic creation. These basic creative abilities can also help people better show their creative thinking and creative ideas in future artistic creation. Therefore, the process and content of children's fine arts curriculum education affect children's artistic expression in adulthood. Children's art curriculum learning not only has a positive impact on children's ability to create paintings, but it also has a positive impact on children's future art creation. For example, in the process of the art design, designers' design consciousness, design ability, and design concept are all important factors for designers to create highly original products (Nagai, Y., Taura, T., & Mukai, F., 2009). The necessary creative consciousness that designers should possess

can be achieved in the process of learning fine arts courses in their childhood stage. Artworks appreciation courses in children's fine arts courses can help children improve their aesthetic ability. It also provides the thinking direction for children's further design concept. Painting skills training can establish basic skills for children's painting creation. It can also help children build a foundation for future design abilities. Therefore, the children's fine arts course establishes a foundation for their artistic creation in adulthood.

Chapter 2: Literature Review

With the development of modern science and technology, many industrial materials are used in painting creation. The usage of these new materials has expanded the expression style and scope of painting works. When computer technology (such as 3D printing technology, digital image processing technology) was applied to the creation of paintings, new fine arts forms emerged with the help of these technologies. The way people acquire knowledge is not only dependent on textbooks and classroom instruction. As people learn more, the direction of people's painting creation is more diversified, and many abstract artistic forms, such as installation art, surrealist art, and pop art have emerged that highlight human ideology. As people receive more channels of information, more artistic forms become known. For children, fine arts learning is not only a single subject skill education, but also a comprehensive education covering multiple types of subject knowledge (Baer, J., 2015). When children learning painting skills, children can also learn some concepts related to mathematics (such as the concepts about symmetry, parallelism, intersection, etc.). The focus of primary school fine arts education is to cultivate children's creative and aesthetic abilities (Chang, Y. S. et al., 2018). Combining knowledge of other subjects in painting teaching has a positive impact on children's creativity behavior in painting.

The process of cultivating children's creativity is also the process of cultivating children's artistic cognition and painting skills (Dijksterhuis, et al., 2006 & Abraham, A., et al.,2007). Children's creative ability is composed of children's intentional behavior and children's artistic expression behavior (Claxton, A. F., et al., 2005). Intentional behavior mainly refers to the children's artistic perception in the process of painting creation, such as children's perception of the texture, light, and brightness of objects. This part is more reflected in children's perception experience. Artistic performance mainly refers to children's ability to express the lines, colors, and shapes of objects in painting works (Chad-Friedman, E., et al., 2019). The process of children's

painting creation is realized from children's perception and experience to children's artistic expression ability. Therefore, the development of children's painting behavior is also a process to help children construct artistic thinking.

Children and fine arts teachers are both subjects in fine arts education. They play equally important roles in children's painting learning. Children's works are realized through the interaction between teacher's guidance strategies and children's cognitive abilities. The process of painting education is a process of visual training for children (Li, S. K., 2018). When children create paintings, children's ability to observe will also increase with children's ability to draw. The key to improving the visual effect of children's paintings is that fine arts teachers provide children with a way to observe the whole and details of things. The balance between the overall content and the part in the painting affects the artistic effect of the painting (Ivcevic, Z., 2007). The content of fine arts education is the foundation of children's creation behavior. The significance of fine arts teaching is to provide children with methods of painting. Children can complete painting creation tasks through school fine arts course learning and painting creation training.

Children's creativity behavior, imagination and expression are important factors in perfecting the content of painting works. Children's control of the structure of paintings depends on children's cognitive ability to space (Malchiodi, C. A., 1998). Children's spatial cognition needs to be acquired under the guidance of fine arts teachers through painting exercises and learning of painting knowledge (such as perspective knowledge and composition knowledge). As for children’s painting creation, teacher's guidance and children's ability to apply knowledge jointly determine children's painting expressiveness. Different from other disciplines, the knowledge of fine arts disciplines is mainly related to visual content (such as the scale, height and width of the objects). Paintings are also the medium through which creators express their personal feelings and communicate with the outside world. Therefore, the teaching of painting is mainly

based on the transfer of visual knowledge through visual information. The setting of fine arts teachers in the content of the course determines the results of children's painting learning. After the teacher understands the children's drawing learning needs (such as the needs of modeling ability, coloration ability and composition ability), designing teaching strategies based on the children's actual situation can effectively help children improve their learning effects.

2.1. Review of Children's Painting Education

Judging from the development of children's fine arts education, the development of school children's fine arts education has gradually changed from children-centered fine arts education to fine arts teacher-led teaching process to assist children in fine arts learning. The essence of child-centered fine arts education is art education that determines the learning outcomes of paintings by children's instincts such as children's personality, intelligence, emotions, perception, aesthetics, and learning performance. This type of education advocates that children's behavior in painting is determined by the level of children's self-development (Dewey, J., 1986). Also, the results of children's learning of painting are achieved through children's painting experience (Dewey, J., 1986). When evaluating children's paintings, grading children's paintings will affect the purpose of fine arts education (Lowenfeld, V., 1960). This kind of painting education method with children as the center of fine arts education has certain defects. These teaching methods place too much emphasis on the development of children's drawing instincts but neglect the education of the basic knowledge of children's fine arts disciplines. The emphasis on children as the center of classroom learning will affect the development of children's painting ability. A systematic evaluation system in children's painting learning process can help children improve their aesthetic judgment. Children's painting ability does not increase with children's age (Yang, J. Z., 2018). Children need to receive systematic fine arts training before they can improve their painting skills.

Fine arts education based on subject knowledge can help fine arts teachers evaluate children's learning progress and painting ability. The clear teaching content and goals help children to better master the fine arts knowledge and then help children to better complete painting creation. Therefore, this kind of education method is more in line with children's painting learning rules.

From the perspective of the implementation method of fine arts education, the methods of fine arts education are mainly divided into two types: painting technique educating and aesthetic sensory educating. The educating of painting techniques was originally applied to professional fine arts education. The purpose of painting technique education is to develop students' painting skills. This education method is mainly to improve the technical level of students' painting. Also, this educational method does not include the development of students' abilities beyond painting techniques. For children, the teaching of painting techniques is suitable for children who have already learned some basics knowledge of fine arts. Training in painting techniques can improve children's basic drawing skills. However, if only children's painting skills are cultivated in the children's fine arts course, then this teaching form is too singular for children and is not conducive to the development of children's artistic creativity. While training children's painting techniques, they should also combine other painting teaching methods. Therefore, the teaching of painting techniques in children's painting education has played a supporting role in the cultivation of children's painting behavior (Cox, M. V., et al., 2000). The aesthetic sensory educating method mainly uses children's interest to guide children to create paintings by observing the appearance of objects (Buffington, M. L., et.al., 2019). In the process of children observing objects, children first perceive the structure of objects through vision, touch, taste, and smell. Then the child associates things according to the situation preset by the teacher. Finally, through the above process, help children stimulate their imagination. Sensory teaching is achieved through the three steps of observation, association and expression (Cropley,

A., 2006). This teaching method can effectively improve children's observation ability and imagination. But this teaching method ignores the development of children's painting skills. In summary, the above can prove that teachers should guide children to learn painting creation in combination with different kind of teaching methods (such as painting techniques training, observing training, and imitation painting works practice training) in the process of children receiving painting education.

In terms of the purpose of fine arts education, it is mainly divided into three types of views: “theory of society as standard for education”, “theory of economic as standard for education”, and “individualistic education” (Wang, D. G., 2014). The theory of society as standard for education refers to the fact that human growth is determined by society (Mason, M., 2008). There is no individual educational in society as standard for education. The core of social standard theory is to educate children who do not have social characteristics into people who are needed by society. Under the influence of this education system, children's fine arts education is related to the development goals of society. This education system emphasizes that fine arts education serves social development but ignores the individual development of children (such as cultivation of children’s personal painting ability). At the same time, under this education system, children's creative behavior will be reduced. The theory of economic as standard for education advocates that people obtain certain economic benefits from the results of fine arts learning (Mason, M., 2008). The level of economic development determines the level of fine arts education. The economic value that painting works bring to people is higher than the creation cost of painting works (Wang, D. G., 2014). Fine arts works and science technology are similar. Both of these things represent new ideas, so there is a connection between fine arts and the economy. Economic value theory mainly emphasizes the significance of fine arts to the economy. Individualistic Education focuses on the development of individuals from a personal perspective (Mason, M., 2008). This theory focuses on the role of fine arts education in children's growth. The

importance of fine art education in this theory is to help children achieve the goal of painting learning. Individualistic Education advocates that children's painting education should follow the rules of children's own development (Fomichov, V. A., et al., 2019).This theory takes the cultivation of children's observation, cognition, creativity, and artistic expression as the focus of children's fine arts education. The combination of the above three perspectives can explain that the educational strategy of individualistic education is most suitable for children's painting instruction.

The importance of fine arts education is to help children develop aesthetic ability. Some researchers believe that children's painting education is an education beyond the discipline itself (Wang, D. G., 2014). This type of theory advocates putting children's aesthetic ability first. Fine arts teachers focus on cultivating children's imagination and emotional expression when guiding children's painting creation. Aesthetic education is mainly to cultivate students' aesthetic habits and ability to appreciate works of art (Jaquith, D. B., 2011). The educational direction of aesthetic education is to cultivate students' artistic accomplishment. Through some aesthetic training (such as artwork appreciation training, observation training and learning the related knowledge of artworks). Students learn the art appreciation ability, they can evaluate painting works according to the knowledge they have learned. And they can independently analyze the cultural connotation of painting works in combination with students' own knowledge level. In difficulty of learning, aesthetic education is higher than the basic fine arts technique education. The educational goal of aesthetic education is to help students expand the scope of their knowledge based on the knowledge of fine arts (Cox, M. V, et al., 1998). Aesthetic education is aimed at children with a foundation in fine arts. Because in aesthetic education, the training that involves appreciation of works of art has a certain difficulty understanding and applying the teaching content of such courses for younger children (children younger than 9 years old) (Norris, J., 2013). Therefore, this teaching strategy has certain requirements on children's cognitive level and age.

Combining all the above can prove that there are certain limitations in different kinds of fine arts education methods. A single fine arts teaching method will limit the development of children's creative behavior. Therefore, school fine arts education should be combined different kinds of teaching method for teachers to guide children's learning.

2.2. Characteristics of Children's Painting Learning at Different Ages

The style of children's paintings will change with children's age, intelligence, and cognitive ability. Children's painting habits will also change with children's continuous painting learning. Children's painting education needs to make teaching plans according to the growth rules of children at different ages. By studying the learning characteristics of children's paintings, teachers can also understand children's thinking and creative thinking. The developmental characteristics of children's painting learning at different ages are also different. The development of children's painting is divided into six stages, namely: "Scribble (2-4 years old)", "Preschematic (4-7 years)", "Schematic Period (7-9 years)" , "Dawning Realism (9-11 years)", "Pseudo Realism (11-13 years)", "Period of Decision (adolescence)" (Cathy A., 1998). The subjects of this study were children aged 7-13. Therefore, this chapter mainly analyzes the painting learning characteristics of children who are in the stage of “Schematic Period”, "Dawning Realism ", and "Pseudo Realism".

2.2.1. Schematic Period

Children aged 7-9 are in the schematic period. Children at this stage begin schooling. Under the influence of school education, children's ability to understand new knowledge is gradually improving. At this stage, children begin to learn how to paint. The more knowledge children 7-9 years old have, the stronger the children's thinking ability is. Children at this stage began to try to express the relationship (positional

relationship, spatial relationship) between objects in painting (Yang, J. Z., 2018). These children began to try to express the external color characteristics of objects in their works. But at this stage, the colors of the same objects displayed by children in their paintings are mostly uniform. These children lack the shades of light and shades of the same objects that appear in the painting occur repeatedly. At the same time, the theme of children's painting changed from self-centered view to the perspective of a third party. The schematic period is the stage in which children's painting ability improves the fastest. The shapes of objects in children's paintings at this stage have fixed and repetitive features (Yang, J. Z., 2016). This stage is also the stage for children to accumulate painting experience. At this stage, children gradually mastered the creation methods of different objects. And when they master the methods of drawing different kind of objects, they will repeatedly use these patterns to apply to different paintings. This will also schematize the shape of objects in children's paintings. Children's painting styles were also formed at this stage. Children in the stage of schematization, they began to consciously establish the positional relationship of objects in the process of painting creation. The order relationship of objects in paintings represents children's composition ability. In the stage of schematization, in order to show the connection between the objects in the images, the obvious positional relationship appears in their paintings. Children's ability to arrange the position of objects can also be equivalent to children's composition ability. Therefore, the teaching strategies for children in the schematic period should focus on the cultivation of basic painting skills (including the cultivation of children's basic color matching ability, simple composition ability, and spatial cognitive ability).

2.2.2. Dawning Realism

Children aged 9-11 are in the period of realist painting. Children at this stage have learned the basic techniques of painting and they already have some painting experience

(Malchiodi, C. A., 1998). Children have mastered basic painting composition skills, color control ability, and the ability to construct the shape after daily painting learning and practice. Children in this period represented their personal consciousness in painting creation. They show their creative ideas in paintings. Therefore, the content of children's works in the dawning realism period is mainly to highlight the children's personal emotional characteristics. In addition, due to the improvement of children's drawing ability, children have added details to objects in this stage of painting. At the same time, children began to use decorative patterns to highlight the features of objects in paintings. At this stage, children's creative ways of creating objects in paintings are more realistic in their paintings (Golomb, C., 2003). These children prefer to portray the details in paintings to show their concerns. For the color matching of children in paintings, the matching of colors in paintings by realistic painting children is mainly based on the colors reflected by the objects in the painting. But during this period, children's awareness of ambient color, adjacent color and light source color is limited. Children at this stage therefore lack the ability to establish connections between different colors. For children's composition ability, the composition of painting works in this period is more complicated than that in the schematic period (Malchiodi, C. A. 2013). Children start trying to create different spaces relationship of object in the painting. The location relationship between different objects in children's paintings is more clear and occlusion relationships appear in some children's paintings. Based on the above, children's drawing instruction in the period of realistic painting should be biased towards helping children to build their cognition of color relationships. For guidance on children's painting composition, fine arts teachers can show children some complicated painting composition methods to help children improve their painting skills.

2.2.3. Period of Pseudo Realism

Children aged 11-13 are in the period of pseudo realism. Children's painting styles at this stage present diversify characteristics. As children grow older, their creative thinking, creative consciousness, and logical thinking have changed, so the style of children's paintings is also changing. Children's painting styles at this stage do not just tend to be realistic. Abstract, decoration and expression painting style also appear in the paintings of children aged 11-13. At this stage, children's ability to shape objects gradually improves (Golomb, C., 2003). They began to pay attention to the proportional relationship between objects in paintings in the overall painting. And a depiction of the dynamics of objects appears in their paintings. Children's cognitive ability of spatial relationships is also improved at this stage. For example, children's painting works show the distance between different objects. There is also a central composition that enlarges the proportion of an object and uses that object as the main body of the painting. For children's ability to control colors, children 11-13 years old began to consider the environmental colors of objects in the painting, the overall color tone of the painting, and the color relationship of the objects in different light effect. Children's color cognition ability at this stage is improved with the improvement of children's painting learning ability. For children's ability to construct the shape of objects, children begin to consider the relationship between the whole and the part of the painting. In the process of painting creation, children will first draw the outline of the object and then add the details of the object according to the needs of the painting. In the period of pseudo-realism, children pay attention to the overall effect of the painting and the connection between the objects in the painting. Therefore, the focus of painting instruction for children aged 11-13 is to cultivate children's overall awareness of painting works and the proportional control between objects in the painting.

2.3. Review of the Composition Style of Children's Painting

Children from 7 to 13 years old are mainly divided into four types of compositional forms: decentralized composition, arranged composition, symmetrical composition, and mixed composition. Children's paintings of different ages have different composition features. The more painting knowledge that children acquired the composition of their work becomes more complex. Children's spatial cognition ability can be analyzed from the composition of painting works. Also, the image organization ability of children can be analyzed through the composition of painting works. Fine arts teachers can help children find problems in their painting creation process through paintings in different composition forms. At the same time, fine arts teachers can appropriately adjust the teaching plan according to the problems in children's paintings. In addition, in order to analyze the composition features of children's paintings in combination with the existing literature, this chapter also shows examples of paintings with different composition features. In order to ensure the reliability of the analysis conclusions, the case works are all unified themes (children 's paintings were required to include houses, trees, and people) and these works are completed by the children within a limited time (children need to complete painting creation within 40 minutes).

2.3.1. Decentralized Composition

The main feature of decentralized composition is that the objects in paintings lack a certain order (Golomb, C., 2003). This also shows that the objects in the decentralized composition paintings lack the connection (such as positions connection between different objects). Most of this composition form exists in the painting works of children with short learning time in painting. There is disorder in the position of objects in such compositions. The positional relationship between different objects in paintings with decentralized composition is unclear. There is also no regularity in the setting of the positions of different objects in these works. The ability of children to create such

compositions is weak.

Children who create decentralized composition works have weak cognitive abilities. Figure 1 is a work created by an 8-year-old boy. The context of the location of trees and houses in his painting is not clear. The house and tree in the painting work are tilted to the right, which proves that the child ignored the direction and position of the objects in the control while creating. And from the characterization of the objects, the structure of the objects in the painting is unstable, so it can be proved that the child's cognitive ability to the structure of the object is weak.

The creator of Figure 2 is a 7 years old girl. This work also has the problem of unclear positional relationship of objects in the painting. There is also a problem with the proportion of objects in the painting. The proportion of the main characters in this work is similar to that of the trees in the background. Judging from the visual effects of the work, this work has the problem of unclear visual center. Therefore, the ambiguity of the objects in the painting will cause the theme of the painting to be unclear. In addition, it can be seen from Figure 2 that the arrangement of objects in the picture lacks certain regularity. Therefore, the lack of positional relationship between objects in paintings will lead to the loose structure of paintings and the affect the visual effect of paintings.

Figure 1. Decentralized Composition

Note. This is an example of a decentralized composition (created by an 8-year-old boy).

Figure 2. Decentralized Composition

Note. This is an example of a decentralized composition (created by an 7-year-old girl).

2.3.2. Arranged Composition

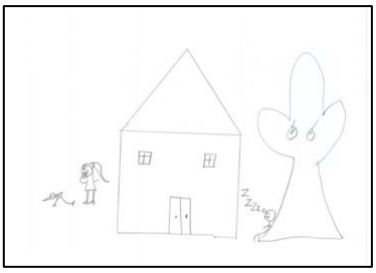
The main feature of arranged composition is that all objects in children's paintings are arranged in a certain order and distance (Yang, J. Z., 2016). There is a certain order between the objects in the compositional painting works of the arrangement. Also, the objects in such composition works are mostly arranged on a horizontal line. Therefore, the works of arranged composition are constructions that only have a flat structure but lack a three-dimensional spatial relationship, such as the front-back relationship, distance relationship, and occlusion relationship between objects in the painting. As shown in Figures 3, 4, and 5, in these arranged composition works, only the planar relationships among the objects have no complicated spatial relationships. The visual perspective of the paintings in the form of composition is mostly the front view. The objects in these works intuitively reflect the basic appearance features of the painting content such as the height, width and proportion of the objects. Arranged composition works are divided into two types. One type is a painting composed of a simple sequence. For example, Figure 3 is a simple sequence of paintings. The other is that all the objects in the painting are arranged horizontally on the base one line. Figures 4 and 5 are examples of horizontal arrangement. Figures 3, 4, and 5 are propositional paintings completed by children in school fine arts classes. The teacher did not restrict the scenes

of the paintings before the children created paintings, but required that houses, trees, and people exist in the students' works. Figure 3 is a painting completed by a 10-year-old girl. From the arrangement of all the objects in the picture, it can be seen that the student simply arranged all the objects in the painting in order according to the painting content requested by the teacher. The positional relationship of the objects in this work is unclear. And from the arrangement of the objects in the painting, it can be proved that the student simply reproduced the teacher's painting creation requirements. Comparing Figure 3 with Figure 4 and Figure 5, Figure 4 can be seen, and the composition of Figure 5 is better than that of Figure 3. Different objects in these works have the relatedness. Figure 5 depicts the proportions and positions of the characters in the painting, showing that there is also a weak spatial relationship in the arranged composition. From the above samples, it can be proved that the children who create arranged composition works have weak spatial cognition ability. The compositional ability of some children may be affected by the theme of creation.

Figure 3. Arranged Composition

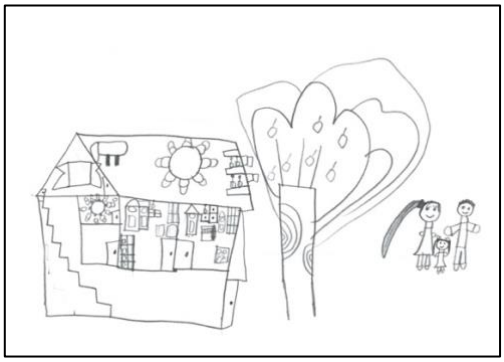
Note. This is an example of an arranged composition (created by a 10-year-old girl).

Figure 4. Arranged Composition



Note. This is an example of an arranged composition (created by a 10-year-old boy).

Figure 5. Arranged Composition



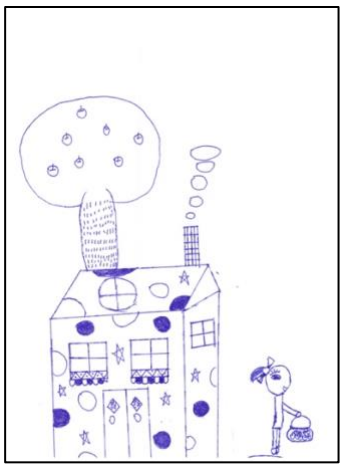
Note. This is an example of an arranged composition (created by a 10-year-old girl).

2.3.3. Symmetrical Composition

Symmetrical composition means that the objects in the work are evenly distributed around the center axis of the painting. The symmetrical composition of the paintings presents the visual effect of the symmetrical arrangement of the objects in the frame around the central axis (Malchiodi, C. A., 1998). This compositional form of painting work will present balanced visual features. The methods of judging children's symmetrical composition painting works mainly include observing the distance between the edges of the painting paper, the correlation of the decorative patterns in different positions, and the echoes between different objects around the center of the painting. In few cases of children's paintings, symmetrical compositions on the left and right sides of the image appear. Most children's works are symmetrical from the perspective of visual perception. In addition, the objects in some symmetrically composed paintings also include local symmetry. For example, the two works shown in Figures 6 and 7 present a symmetrical composition from a visual perspective. And the local symmetry of the work is revealed from the decoration and appearance of the house in the two works. Figure 8 is a symmetrical composition composed of objects of different proportions. The trees and houses in this work are located on the left and right of the central axis of the image with similar height and width, respectively. Figure 9

shows a symmetrical composition composed of similar objects. From the positions of the trees and houses on the left and right of the screen, it can be proved that the painting work is a symmetrical composition composed of similar objects.

Figure 6. Symmetrical Composition

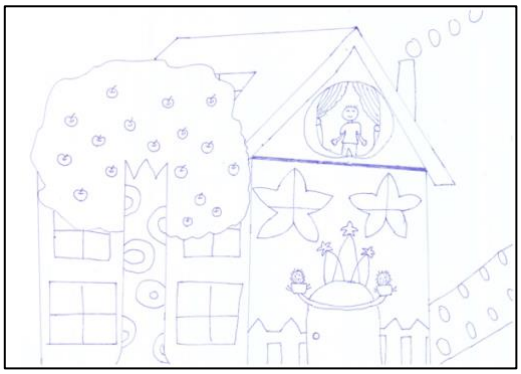


Note. This is an example of symmetrical composition (created by a 10-year-old boy).

Figure 7. Symmetrical Composition

Note. This is an example of symmetrical composition (created by an 11 year old boy).

Figure 8. Symmetrical Composition



Note. This is an example of symmetrical composition (created by a 12-year-old boy).

Figure 9. Symmetrical Composition

Note. This is an example of symmetrical composition (created by a 10-year-old boy).

2.3.4. Mixed Composition

Mixed composition refers to a child constructing two or more spatial relationships in a work. Children in mixed composition paintings create a sense of space in paintings by controlling the proportion, distance, and direction of objects in the image. In this type of compositional painting, children make the various objects in the image connected by increasing the style of the object, increasing the discrimination of the color, and appropriately changing the shape of the object (Golomb, C., 2003). The complication of the image content can also improve the visual effect of the painting. Children divide the image into the upper and lower areas (Figure 11), the left and right areas (Figure 13) or the upper, middle and lower areas (Figures 10 and 12) to increase the spatial visual effect of the painting. In addition, the mixed composition works also include two types of composition: arranged composition and symmetrical composition. The combination of multiple composition forms also improves the integrity of the image structure of paintings with mixed composition. Most of the children who create mixed composition works have a certain foundation and experience in painting. Therefore, most of the mixed composition is in the works of children over 9 years old. In this kind of composition painting works, there are many different positional relationships such as occlusion relationship (Figure 10), distance relationship (Figures

11, 12, 13), and sequence relationship (Figure 13). The combination of different positional relationships in the image can enhance the correlation between objects in the painting. At the same time, it can help children better express the theme of the work and make the painting more storytelling. Teachers' guidance on children's knowledge of spatial relationships when guiding children's painting creations can help children improve their ability to compose paintings.

Figure 10. Mixed Composition

Note. This is an example of a mixed composition (created by a 10-year-old girl).

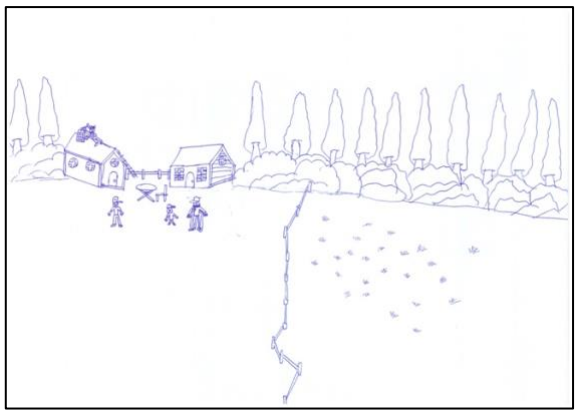
Figure 11. Mixed Composition

Note. This is an example of a mixed composition (created by a 10-year-old girl).

Figure 12. Mixed Composition

Note. This is an example of a mixed composition (created by a 10-year-old girl).

Figure 13. Mixed Composition



Note. This is an example of a mixed composition (created by an 11-year-old boy).

2.4. Review of Children's Painting Style

The formation of painting styles in children's paintings is related to children's daily painting practice. Children's paintings are realized in the process of learning and accumulating painting experience. Painting style is also representative of children's aesthetic orientation. The style of a painting represents the visual form of the painting. For the painter, the painting style represents the visual characteristics of the painting, the artist's artistic expression and the artist's aesthetic concept (Zhou, C. H., 2018). But for children, the style of children's paintings will be affected by their painting experience and ability. Also, children's age, gender, and painting ability are also factors

that affect the painting style of children's paintings. So there is a difference between the painting style of children's paintings and the painting style in the concept of professional painting. Children's painting style is related to children's cognitive ability (DePorter, D. A., et al., 1978). In their paintings, they reflect their feelings about daily life and their perspective on things. Children's painting experience is directly projected into children's painting style. The formation of painting style is related to children's mastery of painting-related knowledge. Children's painting styles are staged and each stage is linked to the growth characteristics of children.

2.4.1. Line Drawing

Line drawing style painting is mainly composed of lines. Children's line drawing style works fall into two main types. One type is the objects in paintings with poor structural features (Malchiodi, C. A., 1998). The other type is a line drawing work that summarizes the outline features of objects with lines only (Yang J. Z., 2016). The first type of line drawing style works mostly appear in paintings for beginners. Children's painting creation learning starts from learning to use lines to create paintings. These painting beginners have weak ability to construct the shape, color application ability, and spatial expression ability. In the poor structural features line drawing works, there are problems that the shape of the object is not clear, the lines in the painting lack a sense of order, and the position relationship of the objects in the painting is not clear (Figure 14). Another type of painting in the style of line drawing often appears in the works of children with a certain painting foundation (Figure 15). The outline features of objects in this type of line drawing style work are expressed by lines. The core of creating such paintings is the children's ability to control lines. Paintings in the style of line drawing mainly depend on the degree of change of the line to determine the shape, direction and position of the object, because the painting works are mainly based on the changes in the line to control the visual effect. It is difficult for children to show all the

visual characteristics of objects with only lines. Most children's painting space expression ability depends on different painting materials to express the connection between objects. But in the creation process of the line drawing painting, children use less painting materials. Simple lines and single tones make the line drawing works visually flat. And because of the low degree of color discrimination between the objects in the line drawing works, this has also led to weaker spatial visual effects in line drawing style paintings.

Figure 14. Line Drawing with Poor Structural Features

Note. This is an example of line drawing style painting (with poor structural features).

Figure 15. Line Drawing with Structural Features

Note. This is an example of line drawing style painting (with structural features).

2.4.2. Realistic Style

There is a difference between children's realistic painting and professional realistic style. The realistic style in professional painting refers to the reproduction of a scene in

life with a painting. In terms of the spatial expression of painting works, professional painters will reproduce the sense of space in the display scene by controlling the brightness of the colors in the painting, the front and back positions of the objects, and the proportion of the objects. Compared with most children's paintings, there are some differences between children's realistic style painting and professional realistic style painting. Children are limited by their drawing abilities and cognitive abilities. Children's paintings cannot perfectly reproduce the scenes in life (Figure 16). Even the appearance characteristics of the same object in real life are different from those in children's works. The characteristics of children's works conforming to the realistic style are mainly judged from the overall composition of the painting, construct the shape characteristics of the objects in the painting, and the contents of the painting. For children's paintings, the overall visual effects of children's works and the objects in the painting conform to the appearance laws in real life can be regarded as having characteristics of realistic style. The division of the style of children's paintings is mainly based on the content of the paintings. Therefore, paintings that partially reproduce life scenes can also be regarded as realistic style paintings. In addition, in terms of color, most children will color objects according to their original color characteristics. In this type of painting, the hue and lightness of the picture are determined by the external characteristics of the creative object.

Figure 16. Realistic Style Painting

Note. The example of realistic style painting.

2.4.3. Abstract Style

Children's paintings in abstract style are characteristic of imagery. And the core of children's paintings in abstract style is to show children's emotions and aesthetic images through exaggerated structure the objects. Children's abstract style paintings fall into two main forms. The first is that children emphasize the theme of paintings by changing the proportions or dynamics of several objects in the picture (Qin, H., 2018). This kind of abstract style works is mainly to enhance the effect of the painting by changing the overall or partial shape of the objects (Figure 17). The appearance effects of objects in this type of painting are all transformed by children. In the paintings of animals or plants created by children, there will be dynamic exaggeration to express the physical characteristics of animals or plants (Figure 18). There are also some paintings in order to highlight the atmosphere of the scene in the painting (Figure 17). Children will exaggerate the facial expressions or movements of the characters in the paintings. The other is the children's overall transformation of the shapes of all objects in the painting to achieve exaggerated artistic effects (Qin, H., 2018). Changing the appearance characteristics of all objects in a painting will change the visual effect of the painting (Figure 18). Also, this style of work breaks children's conventional aesthetic habits, coloring habits, modeling habits, and composition habits. Abstract style painting advocates the visual experience provided by the painting. In children's paintings, there are often strong contrasts in tones, extreme contrasts in the proportion of objects, and contrasts in spatial relationships (for example, the overlook view effect and the usual effect appear in the painting at the same time). From the perspective of children's painting learning, the requirement for children's painting ability to create abstract style painting is the highest of several painting styles. And this style of painting has the highest coefficient of creative difficulty. Therefore, the premise of learning to create abstract style painting is that children need to have a certain painting technical foundation and these children need to have certain color cognitive ability, composition

ability, and physical cognitive ability.

Figure 17. Abstract Style Painting

Note. This is an example of abstract style painting.

Figure 18. Abstract Style Painting

Note. This is an example of abstract style painting.

2.4.4. Decorative Style

Decorative style children's paintings refer to the decorative visual effects of the local existence of the work with decorative patterns or the overall painting (Zhang, Y., 2017). The perspective relationship between objects in decorative style painting is not obvious (Li, Q., 2016). And most of these works have a flat visual effect (Figure 20). Intricate decorative patterns appear in decorative paintings. Although these patterns improve the visual effect of the painting, these patterns also weaken the connection between objects in the image (Figure 19). So the appearance of these patterns also

reduces the spatial visual effect of the painting. In terms of the use of painting materials, children will use some new types of painting materials in decorative paintings to increase the decorative effect. Children will use the characteristics of different materials to increase the texture of objects in the picture to improve the visual effect of the image. For example, children will use cardboard, newspaper, plastic wrapping paper and other materials to collage materials in painting works. In order to enhance the artistic aesthetic characteristics of paintings, some children will add decorative patterns to the appearance of the objects in the paintings to increase the decorative beauty of the objects. In addition, repetitive decorative patterns such as repeated geometric figures appear in decorative style paintings, making children's paintings more orderly.

Figure 19. Decorative Style Painting

Note. This is an example of decorative style painting.

Figure 20. Decorative Style Painting

Note. This is an example of decorative style painting.

2.5. Review of Teaching Methods for Creative Behavior in Different Countries

The methods of fine arts teaching determine the results of children's painting learning. The process of children's learning of fine arts is also a process of helping children build their knowledge of the fine arts discipline. For children, the purpose of participating in fine arts learning is not limited to cultivating their painting skills, but to help children build creative thinking through learning about fine arts. In the development of globalization today, the teaching ideas for the cultivation of children's creativity should not be limited to a certain region or country (Hu, Z. F., 2019). The creative direction of children's painting should be diversified (Seage, S, et al., 2020). Children need to try to use different painting materials and to create different styles of painting to support their painting creation. Children's artistic vision and knowledge of art also determine children's artistic expression. It is very difficult to promote the creation of children's fine arts only by relying on children's own artistic cognition. Therefore, proper guidance has played a contributing role in improving children's creativity and constructing artistic cognition. For the fine arts discipline, the educational direction and methods of fine arts education should be constantly adjusted according to the teaching environment and teaching objects (Tzuo, P. W., 2007). Children's participation in the implementation of fine arts teaching is just as important as the learning environment created by fine arts teachers. The meaning of teachers and students for fine arts education is equally important. Reviewing the development of the fine arts education theory in different countries is from "Discipline-Based Art Education" and "Child-Centered Curriculum" to today's education theory that advocates the integration of the two education theories of discipline education and the development of children's own creativity. Reviewing the fine arts teaching methods and of different countries, it can be proven that there is a certain connection between the fine arts teaching methods between countries and it also covers the characteristics of teaching on behalf of each country. Children's fine arts teaching methods in different

countries are based on different cultural backgrounds, but the ideas of children's fine arts education between countries still have similarities.

2.5.1. Review of Teaching Methods in Asian Countries

Compared with other countries, the teaching content of fine arts education in Singapore is more comprehensive. Under their art education system, children's drawing ability and aesthetic ability have been improved. Singapore art teaching mainly includes courses in basic painting techniques, art design courses, handmade courses, fine arts appreciation courses (Tan, A. G, 2000 & Brouillette, L., 2009). Also, in Singapore's fine arts teaching charter, each lesson for children at different stages has a detailed teaching plan and teaching implementation details. Therefore, the advantage of Singapore children's fine arts teaching is to help children comprehensively understand painting skills and fine arts knowledge.

Children's fine arts education in Malaysia is mainly to cultivate the creative ability of children's fine arts works. The advantage in Malaysia's art education is that they have included lessons in children's art courses about learning to make traditional crafts in the country (Haji Ahmad, R., 1998 & Barghi, R., et al., 2017). Their fine arts teaching process is to involve children in different forms of artistic creation activities to enhance children's creativity in the process of artistic creation.

In terms of Japanese children's fine arts learning environment, elementary schools in Japan provide students with open art learning spaces so that children can create paintings in a free learning environment. In the children's fine arts classroom, teachers develop children's independent creative ability (Cave, P., 2007). In terms of the training of fine arts teachers, all fine arts teachers need to participate in fine arts teacher training courses corresponding to uniform standards before teaching (Hu, Z. F., 2019). So Japanese fine arts education focuses on the teachers' teaching ability and the atmosphere that children learn to paint.

Children's fine arts education in India is organized around different learning themes. Fine arts teachers will arrange different painting learning tasks for children according to different educational themes (Hu, Z. F., 2019). Their fine arts education goal is to guide children to think and feel the meaning of fine arts to life. For example, in an environment-themed fine arts course, teachers would ask children to create environment-themed paintings. Also, fine arts teachers will also teach children to use some idle materials in daily life to create paintings. The importance of these thematic courses is to guide children to think about the relationship between man and nature and to cultivate children's environmental awareness.

The goal of Chinese children's fine arts education is to cultivate students' comprehensive art ability. Also, Chinese children's art education focuses on cultivating children's creative consciousness and aesthetic ability. The children's fine arts course is mainly divided into four parts: the study of relevant knowledge in the fine arts field, the knowledge study of the combination of fine arts and other disciplines, the study of basic painting techniques, and the study of traditional Chinese fine arts (mainly studying Chinese painting and calligraphy) (Hu, Z. F., 2019). In addition, in order to allow children to better experience the traditional Chinese painting art, some schools offer separate courses in calligraphy and Chinese painting. The importance of these courses is also to help children learn more about Chinese culture in the process of learning traditional Chinese painting.

2.5.2. Review of Teaching Methods in Western Countries

Children's fine arts education in the UK starts from the age of 5 to 14 years. Their teaching methods are mainly based on experiential teaching. British fine arts education focuses on the application and meaning of art in life (Lunke, K., et al., 2019). The content of the fine arts course is mainly about the basic skills of painting, art design and experience making handicrafts. Britain values children's ability to understand art

culture. Also, by analyzing the relevant knowledge of art works, the purpose of improving children's aesthetic ability is achieved.

Children's fine arts education in France begins in kindergartens. In terms of children's painting creation learning, French painting courses are mainly for fine arts teachers to guide children to create paintings with different visual effects (Hu, Z. F., 2019). Experience painting in different styles in painting practice. Enhance children's creativity and imagination with the use of different painting materials. French fine arts education mainly allows children to feel the creative process of painting works with different painting styles in this way to improve children's artistic aesthetic ability and creativity.

In Germany, children's fine arts courses are divided into two separate subjects: painting and craft lessons. The two subjects are taught by teachers of different specialties for children. The reason why Germany values children's handicraft education is that making handicrafts can comprehensively develop the comprehensive ability of children's artistic creation (Luccarelli, M., et al., 2019). In order to provide a better learning environment for children, German schools also set up a workshop for crafts for children. In addition, the teaching atmosphere in German fine arts classrooms is also liberty. Children can communicate with teachers and classmates at any time while studying.

The educational content of children's fine arts education in the United States is mainly divided into two types: painting creation courses and art design courses. Their fine arts education is mainly to guide children to observe things in nature so that children learn to find inspiration for painting in life (Smith, K. B., 2019). At the same time, the fine arts teacher will lead the children to analyze and evaluate the constructing the characteristics of objects, color characteristics, and aesthetic characteristics of the artwork. Adding painting appreciation lessons in the fine arts class can help improve children's aesthetic abilities. Also, fine arts appreciation can also provide children with

inspiration and direction for painting.

The focus of education for children's fine arts education in Canada is mainly in two aspects. On the one hand, it allows children to acquire relevant knowledge of painting creation in the process of experiencing painting creation (Dunning, P., 1997). On the other hand, it guides children to think about the meaning of works of art. In the process of children's learning and painting, fine arts teachers will teach children how to observe the characteristics of objects to help children improve their observation ability. With regard to the education of fine arts knowledge, teachers use some images to help children understand painting knowledge. Teachers use images of different types of paintings to explain the knowledge of art jargon and art skills. In terms of children's painting creation learning, fine arts teachers will ask children to explain their creative ideas and sources of creative themes. The purpose of the teacher to do this is to help children establish the direction and mode of thinking in drawing creation. In addition, fine arts teachers will let children analyze the visual characteristics of objects in daily life. Children's analysis of the visual characteristics of objects allows children to experience the significance of artistic creation for daily life.

The core of Australia's children's fine arts education curriculum is the creative fine arts curriculum. Australian fine arts education focuses on the practical application value that students receive after studying painting (Hu, Z. F., 2019). Children realize the dual functions of fine arts learning (aesthetic function and practical application function) by learning to paint (Meiners, J., et al., 2004). After the children participate in the fine arts course, they can reach the educational goal that children have both the ability to create paintings and the practical application of artistic creation in life. In terms of the evaluation methods of painting course learning, the results of children's painting creation are not the only basis for art teachers to evaluate the results of painting learning. Fine arts teachers pay more attention to the development of children's drawing ability. The fine arts teacher will evaluate the children's entire learning process and the ability

of all aspects of painting creation.

Children's fine arts education in New Zealand advocates the connection between fine arts and other disciplines (Bell, D., 2010 & Laird, J., 2012). Their fine arts education focuses on the common development of painting creation learning and other courses. They believe that the study of fine arts courses can promote learning in other disciplines. New Zealand's fine arts teachers draw lessons from other disciplines to help children learn. For example, when a child learns painting, a fine arts teacher will apply some mathematical knowledge to help children learn painting. When a child calculates the proportions and sizes of objects in a painting, the fine arts teacher instructs the child to apply some mathematical calculation methods. When the fine arts teacher instructs children to create decorative paintings, the fine arts teacher will use some terminology in mathematics courses such as symmetry, flipping, and repeating to help children learn.

2.5.3. Differences Between Chinese and Other Countries in Children's Painting Course

In terms of the number of participants in each fine arts course at primary school in China has about forty to eighty participants. Due to the high number of participants in the fine arts course in Chinese primary schools. Thus fine arts education in Chinese primary schools educates children base on discipline. Discipline-based art education can help children learn fine arts knowledge and painting techniques in a systematic way. However, children's individual creative expression is difficult to develop in a fine arts course. Discipline-based art education includes explicit learning objectives and learning content. This form of course helps children learn about art in a more holistic way. It also can be accessible to children of different painting abilities and painting skills training. However, there are some drawbacks to this form of teaching. For example, when the fine arts teacher teaches students teachers will ignore the children's understanding and application of the course content because of considering the teaching progress and teaching goals. As a comparison, the number of participants in fine arts

courses in other countries is relatively small compared to China. As a result, fine arts teachers in other countries have had more time to develop individualized courses for children to create their creation behavior according to the different painting types of children. While children's creative abilities can be improved in this format. But it also reduces children's cognition of the knowledge about fine arts expertise. For example, if a fine art teacher devotes time in the course to promote children's creative thinking and imagination. Then the time that children used to learn the knowledge of painting techniques will be reduced. In sum, there both have advantages and disadvantages in China's art education and art courses in other countries.

From the perspective of the setting of fine arts course content, the content of the Chinese primary school fine arts curriculum is related to the learning of painting knowledge and the training of painting skills. Compared to the content of fine arts courses with other countries, there are fewer courses related to art design and hand-made courses in Chinese primary school art courses. Therefore, this will also limit Chinese children's ability to recognize the knowledge of art in different art forms. In addition, compared to the fine arts course with other countries, China's fine arts course lacks the connection between art subjects and other subject knowledge education. The content of fine arts courses in China is about helping children understand fine arts knowledge and painting creation knowledge. Children's ability to perceive the connection between the art discipline and other disciplines is weak. Related knowledge education between different disciplines can help children better understand art knowledge and knowledge in other disciplines.

2.5.4. Summary of Teaching Methods for Creative Behavior in Different Countries

The current direction of fine arts education is to cultivate children's creativity and aesthetic ability. Children learn the methods of observation and artistic thinking through painting. In terms of course content, there are courses in basic painting techniques in

fine arts courses in different countries. Therefore, the study of painting techniques is the basis for cultivating children's artistic creativity. And basic skills education is also one of the ways to cultivate children's artistic cognition. The improvement of children's creative ability is mainly achieved through the analysis of the characteristics of fine arts works, interdisciplinary learning, observation of the natural environment, and imitation of these teaching methods. The cultivation of children's creativity cannot be confined to fine arts courses. The integration of multiple disciplines is the development trend of children's fine arts education in the future. Different types of fine arts education can effectively enhance children's creative thinking and expand children's creative thinking of painting. The courses of traditional painting culture are also helpful for children's painting creation. Because the courses of traditional painting can allow children to better understand the cultural context of their country. The traditional painting courses also have the function to expand the scope and creative thinking of children’s painting creation. In addition, in the evaluation of children's artistic creativity, children's paintings cannot be used as the sole evaluation content of children's creativity.

Chapter 3: The Impact Test of Fine Arts Teachers on Children's Painting

3.1. Introduction

The teaching methods of fine arts teachers are of important role to children's art learning. Children's creative thinking of painting is determined by the teaching content of fine arts teachers. The art teacher is the organizer and guider of the children's drawing lessons. The education strategies of fine arts teachers influence children's creative direction and creative results (Elliott, S. E., et al., 2019). The purpose of painting education is to guide children to master the methods of painting creation. The quality of a painting is determined by the visual effects of the painting. Lines, colors, and composition in paintings are important factors that constitute the visual effects of paintings. Lines, colors and composition are summed up by painting learners constantly observing things in life.

The importance of fine arts teachers is to guide children to use effective observation methods to help children get creative inspiration. The process of painting education is also the process of transforming the visual information obtained by fine arts teachers to children into paintings (Cooper, Y., et al., 2020). The learning atmosphere of fine arts classrooms in school will also affect the results of children's painting creation (Cho, J. Y., 2017). The classroom atmosphere provided by fine arts teachers will also affect children's painting creation. A well classroom atmosphere can ease children's learning pressure. For some children who do not like painting lessons, a free learning environment will increase children's interest in painting learning. The arrangement of fine art teachers' teaching content is also the key to children's painting inspiration. In order to stimulate children's imagination, teachers will provide children with visual and auditory information in fine arts courses. This information will influence the direction of children's painting. And children use this information in their

paintings when creating.

The development of children's cognitive ability and aesthetic ability will be reflected in the content of fine arts teaching. The arrangement of fine arts courses will change children's interest in painting learning. The content of the painting course determines the attitude of children's painting creation. And children's motivation for painting learning will change with the content of fine arts courses. The guidance and evaluation methods of fine arts teachers when children create paintings will affect the artistic effect of children's paintings. When fine arts teachers guide children's painting creation, teachers will pass their drawing experience to children. When children practice painting, they will recall and imitate the teacher's painting methods. The teaching effect of fine arts teachers is directly reflected in children's paintings (Prabhu, V., et al., 2008). Therefore, the content of fine arts teachers' classroom teaching will affect children's painting creation.

Children's painting learning process consists of teachers' classroom education, children's painting exercises, and teachers' evaluation of children's learning results. Among them, the teacher's evaluation of children's learning results is a process in which teachers help children to correct problems in the learning process. Teacher evaluation criteria and methods in this process will also affect children's learning interest. If fine arts teachers only pay attention to the results of children's painting, this will affect the improvement of children's creative ability. And this will prevent some children's wrong painting habits from being improved. When teachers evaluate children's paintings, there will be teachers' aesthetic preferences in the evaluation results. Some children will improve the way in which some objects in paintings are created based on teacher evaluations. So the aesthetic preferences and evaluation methods of fine arts teachers also affect the content of children's paintings.

When children observe an object, they perceive the characteristics of the object through sight, hearing, smell, and taste. Painting creation activities can only be realized

under the combined effect of children's perception ability and painting ability. However, because children of different ages have different observation abilities, children's perception ability will also have a certain deviation. The tasks of children's painting exercises need to be arranged according to the level of cognitive development of children of different ages. The process of painting education is the process in which fine arts teachers help children transform their experience of perception into paintings. The primary task of fine arts teachers is to develop learning content suitable for children based on their growth. Teachers need to assess children's level of painting creation before implementing a painting course.

Children's study status is also reflected in children's behavior in the classroom. For example, if a student is interested in what the teacher has arranged for the child, the child will be instructed by the teacher and will give prompt feedback on the task assigned by the teacher. Conversely, if students complete learning tasks with a negative attitude, children may have doubts about some of the learning content or children may have difficulty in drawing. Therefore, fine arts teachers can judge children's classroom study status based on their behavioral performance in painting learning. And based on children's learning performance, children's acceptance of teaching content can also be judged simply. In addition, observing children's different behaviors can also help children solve their creative difficulties. For children with weak creative abilities, teachers can provide children with ideas and methods for painting according to their drawing abilities. For example, teachers can reduce the difficulty of creative tasks to increase children's interest in painting. Or provide children with some image cases to help children expand their creative scope.

3.2.Background

The classroom learning atmosphere created by fine arts teachers will affect the results of children's painting creation and learning（Chad-Friedman, E., et al., 2019）。

A free painting learning environment can reduce children's negative emotions in painting creation. The effect of school fine arts curriculum learning is also affected by the relationship between teachers and children (Sawyer, R. K., 2006). If there is a confrontational relationship between teachers and students, children will maintain negative emotions in the study of painting. Keeping negative emotions in learning for a long time will make children lose interest in painting creation. The process of school fine arts education is the process of teachers transmitting fine arts knowledge and emotional communication to children (Skains, R. L., 2018). If the child is willing to accept the teacher's guidance, the teacher's teaching content can be understood by the child. Therefore, the communication effect between fine arts teachers and children will also affect children's fine arts learning.

Children's understanding of fine arts knowledge will also determine children's learning results (Cutcher, A., et al., 2018). The prerequisite for children to use painting techniques is to understand the teaching content in the fine arts course. Children also completed the learning tasks arranged by teachers in this process. The process of fine arts teaching in school is the process of communication between fine arts teachers and children. If the child accepts and understands the teaching content of the fine arts teacher, it can also prompt children's ability to create different visual effects of paintings (such as abstract or realistic style paintings). Fine arts teachers manage children's painting habits in children's drawing exercises. When the fine arts teacher directs the children to perform painting exercises, the teacher will guide the children's painting creation process (for example, teach the children about the method of observing objects, painting composition process, coloring process and modeling process). The process of these painting creations is also the process of constructing children's painting creation habits. Children's painting habits also affect the visual effects of children's paintings. In this test, the influence of classroom learning environment on children's painting creation will be tested. Children's performance in fine arts course learning can judge

children's painting learning behavior. So this study also test children's attitudes about the fine arts class learning environment.

In the process of children's painting creation learning, the teaching mode of fine arts teachers affects the results of children's painting learning (Cutcher, A., et al., 2016). The fine arts teaching model is also the structural framework of fine arts courses (Meiners, J., et al., 2004). The model of art courses determines the order and process of fine arts teaching (Taylor, R. D., et al., 2017). Children directly obtain the learning strategy of art learning through the teaching mode designed by art teachers. For example, when children learn to analyze the artistic characteristics of works of art, art teachers will provide art appreciation courses for children. The art appreciation course is one of the teaching modes of the fine arts course (Gu, T., 2018). In these art appreciation courses, fine arts teachers provide evaluation methods and evaluation standards for children. Therefore, different fine arts teaching models also provide students with the basis of painting practice (such as perspective knowledge, composition knowledge and color matching knowledge). The teaching mode of fine arts teachers refers to the design of fine arts courses of teachers and the implementation methods of fine arts courses. In the fine arts classroom, children will learn the painting techniques and fine arts knowledge according to the teaching content preset by the art teacher. The design of teaching mode by fine arts teachers can solve the problems encountered by children in painting creation in a targeted manner. For example, some children are weak in their ability to control the overall hue of their paintings. In response to this problem, art teachers will use copy paintings teaching and observation teaching to help children to improve the ability to control the color tone. In terms of enhancing children's aesthetic abilities, fine arts teachers will arrange art works appreciation classes to guide children to understand the aesthetic characteristics of art works through the appreciation of art works. Therefore, a well fine arts teaching model can help children improve their ability to create paintings.

The evaluation and attitude of fine arts teachers towards children determine children's interest in learning (Wang, D. G., 2014). Positive comments from fine arts teachers can help children increase their interest in painting learning. Conversely, negative evaluations will reduce children ’s interest in painting. Teachers' negative evaluation of children can also affect the visual effects of children's paintings (Bresler, L., 1998). When art teachers evaluate children's paintings, if they only evaluate the shortcomings in children's paintings and ignore the advantages in children's paintings, this will reduce children's interest in create painting works. And it is not conducive to the improvement of children's painting creation skills. In the children's painting guidance, teachers help children to establish their cognition of their own painting ability (the advantages and disadvantages of children's paintings), which helps children to better complete the painting task. When a fine arts teacher evaluates a child's painting, the teacher will evaluates the color composition, composition style, and shape features of their painting. Fine arts teachers will also evaluate children's paintings based on their own painting experience and aesthetic cognition (Mikhailovich, S. I., 2018). These evaluations include teachers' subjective consciousness. For example, when teachers evaluate children's modeling ability, teachers will combine their own observation experience and shape cognition. When fine arts teacher evaluates the visual effects of a child's painting, the evaluation result of the painting will also include the teacher's personal aesthetic attitude. Therefore, assessments from fine arts teachers affects the children's drawing skills and visual expression. When children doing painting exercises, children will also modify the problems in their works (such as color problems, composition problems, and modeling problems) according to the evaluation results of fine arts teachers. Therefore, the evaluation of fine arts teachers is also one of the factors that form the style of children's paintings.

In the study of painting creation, children's learning ability and the guidance of fine arts teachers both affect the results of children's painting creation (Cvetkova, B., et

al., 2010). Children's ability to learn painting includes children's understanding and application of the content of painting courses. Fine arts teachers' arrangement of the content of courses will also affect children's ability to learn painting. Different content in the fine arts curriculum can help children build different drawing creation abilities (Boyd, W., et al., 2015). For example, the appreciation of painting works, children can improve children's aesthetic ability by analyzing the artistic characteristics of paintings (such as modeling characteristics, composition characteristics, color characteristics, etc.). Children's aesthetic ability is the foundation of children's painting creation. Therefore, the content of fine arts courses affects children's ability to create paintings. Children's ability to learn painting needs to be established through continuous accumulation of children in painting practice. For example, for some children who have just started to learn painting, fine arts teachers will arrange to demonstrate the use of different painting materials in the content of painting courses to help children understand the characteristics and methods of different painting materials. After children understand the characteristics of different materials, children begin to learn painting techniques and the application of painting materials. Therefore, children's drawing learning ability is achieved through painting skills training. At the same time, the arrangement of fine arts teacher's course content will also affect the performance of children's painting creation.

3.3. Methods

3.3.1.Content for the Test

This study used a questionnaire survey method to test children's attitudes towards teachers' suggestion (Question 1) , teachers' encouragement (Question 2) , teachers' teaching style (Question 3) , classroom atmosphere (Question 4), painting learning ability (Question5) , painting technique guidance of teachers (Question 6) and painting creation guidance of teachers (Question 7) (in Appendix A, Questionnaire 1). The

purpose of the questionnaire survey is to analyze the effects of teachers' teaching methods, teachers' evaluation and fine arts classroom environment on children's painting creation learning by testing their attitudes. This study will also analyze the influence of fine arts teachers on children's painting creation learning based on children's gender and age.

3.3.2. Participants

A total of 1376 children participated in this part of the test (Table 1). There are 669 girls and 717 boys. All children participating in the test are between 7 and 13 years old (319 children between 7-9 years old, 638 between 9-11 years old, and 419 between 11-13 years old). Because this part studies the influences of school art teachers and school fine arts courses on children's painting learning, the questionnaire data used in this part of the research are all completed by children in school fine arts courses.

Table 1. Gender and Age Distribution.

	Gender		**Age**			**Total Number of Children**
	girl	**boy**	**7 < age ≤ 9**	**9 < age ≤ 11**	**11 < age ≤ 13**	
N	659	717	319	638	419	1376

Note. This table shows the gender and age distribution of children participating in the test.

3.3.3. Results

Before the data analysis, in order to ensure the reliability and relevance of the content of the questionnaire, all the data were analyzed and correlated (Table 2). From the value of Cronbach's Alpha value of 0.819, it can be proved that the children who participated in the test all answered questions based on their actual situation. Therefore, the test results of all questions in the questionnaire are reliable. The value of 0.857 from KMO and Bartlett's Test shows that each question in the questionnaire truly shows the characteristics of the variables and meets the criteria for continued analysis.

Table 2. Reliability and Correlation Analysis

Result of Cronbach's Alpha and KMO		
N of Items		7
Cronbach's Alpha		.818
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.857
Bartlett's Test of Sphericity	Approx. Chi-Square	2871.837
	df	21
	Sig.	.000

Note. This table shows the result of Cronbach's Alpha (0.819) and KMO (0.857).

In this part of the study, analysis of variance was used to analyze the differences in the attitudes of children of different genders towards teachers' suggestion, teachers' encouragement, teachers' teaching style, classroom atmosphere, painting learning ability, and painting technique guidance of teachers, a total of 6 test items (Table 3). According to the test results, the attitudes of the children of different genders to all six test items showed significance (p <0.05). This also shows that children of different genders showed significant differences in their attitudes towards the six test items. Children of different genders have different attitudes towards teachers' suggestion. Comparing the average results of boys and girls (mean = 4.89 / 5.23) can prove that boys and girls have a positive attitude towards fine arts teachers' suggestion. Also, girls are more willing to accept the suggestion of fine arts teachers than boys. Both boys and girls have a positive attitude towards the test (teachers' encouragement). By comparing the average value of boys and girls (mean = 5.11 / 5.50), it shows that girls pay more attention to the evaluation of fine arts teachers. According to the analysis results of children 's attitudes towards teachers' teaching style (F = 6.460, p = 0.011), there are differences in the attitudes of boys and girls about the teaching style of fine arts teachers. From the average result of boys and girls (mean = 4.08 / 4.35), it can be proved that girls are more likely to accept the teaching methods of fine arts teachers than boys. Both

boys and girls like to learn painting in a pleasant classroom atmosphere. Comparing the average results of boys and girls (mean = 4.47 / 4.79) shows that girls prefer to learn painting in a pleasant classroom atmosphere than boys. Both boys and girls can master the painting method introduced by the art teacher (F = 38.510, *p* = 0.000). At the same time, according to the average results of boys and girls (mean = 4.35 / 4.95), it shows that girls 'understanding of painting methods is higher than boys'. Children of different genders have a positive attitude about the test technique of painting technique guidance of teachers. Comparing the average results of boys and girls (mean = 4.18 / 4.44) shows that girls are more willing to accept art teachers' painting technique guidance than boys.

Table 3. Difference Analysis

Variables	**Gender (Mean ± Standard Deviation)**		**F**	***p***
	boy	**girl**		
Teachers' Suggestion (Question 1)	4.89±1.94	5.23±1.76	12.014	0.001**
Teachers' Encouragement (Question 2)	5.11±1.95	5.50±1.83	14.847	0.000**
Teachers' Teaching Style (Question 3)	4.08±1.89	4.35±1.98	6.460	0.011*
Classroom Atmosphere (Question 4)	4.47±1.96	4.79±1.97	9.386	0.002**
Painting Learning Ability (Question 5)	4.35±1.80	4.95±1.81	38.510	0.000**
Painting Technique Guidance of Teachers (Question 6)	4.18±2.07	4.44±1.98	5.798	0.016*

Note. * p<0.05 ** *p*<0.01

In order to test the correlation between the children's attitude towards teachers' encouragement and the two test items of teachers' suggestion and painting learning

ability, Pearson correlation coefficient was used to analyze the correlation (Table 4). The correlation coefficient between the test item teacher's encouragement and the test item teachers' suggestion is 0.617, and it shows a significance of 0.01 level, which shows that there is a significant positive correlation between the two test items. At the same time, the Pearson correlation result is positive. So, it can also prove that the encouragement and positive suggestion of fine arts teachers have a positive impact on children's painting learning. The correlation coefficient between the test item teachers' encouragement and the test item painting learning ability is 0.539, and it shows a significance of 0.01 level, which shows that there is a significant positive correlation between these two test items. Because of the Pearson correlation result is positive. It can also prove that the encouragement of fine arts teachers has a positive impact on children's ability to learn painting.

Table 4. Correlations Analysis Results

		Teachers' Encouragement (Question 2)
Teachers' Suggestion (Question 1)	Pearson Correlation	0.617**
	p	0.000
Painting Learning Ability (Question 5)	Pearson Correlation	0.539**
	p	0.000

Note. **Correlation is significant at the 0.01 level (2-tailed).

In order to test the correlation between teachers' teaching style and classroom atmosphere, this part uses the Pearson correlation coefficient to analyze the correlation between the two test items (Table 5). The correlation coefficient between the test item teachers' teaching style and the test item classroom atmosphere is 0.544, and it shows a significant level of 0.01, which shows that there is a significant positive correlation between the two test items. At the same time, it can also prove that the proper teaching methods and pleasant classroom atmosphere of fine arts teachers have a positive impact

on children's painting learning.

Table 5. Correlations Analysis Result

		Teachers' Teaching Style (Question 3)
Classroom Atmosphere (Question 4)	Pearson Correlation	0.544**
	p	0.000

Note. **Correlation is significant at the 0.01 level (2-tailed).

In order to analyze the differences in the attitudes of children of different ages towards the painting creation guidance of fine arts teachers, the analysis of variance method was used in the analysis (Table 6). From the analysis results of Table 6, it can be seen that the attitudes of children of different ages to the painting creation guidance of fine arts teachers are all significant (F = 3.174, p = 0.042 <0.05). This also means that children of different ages have different attitudes towards the test items (painting creation guidance of teachers). Comparing the average results of the three age groups shows that children aged 7-9 are most willing to receive painting creation guidance from fine arts teachers in the fine arts course. At the same time, as children grow older, children's willingness to accept fine arts teachers' guidance is lower.

Table 6. Attitudes of Children of Different Ages to the Guidance of Fine Arts Teachers

	Age (Mean ± Standard Deviation)			**F**	***p***
	7 < age ≤ 9	**9 < age ≤ 11**	**11 < age ≤ 13**		
Painting Creation Guidance of Teachers (Question 7)	4.12±1.88	4.03±2.03	3.79±1.79	3.174	0.042*

Note. * p<0.05

3.4. Discussion

This part of the study tested the influence of the teachers and the atmosphere of fine arts courses on children's painting learning. The above test results show the

influence of the fine arts teacher's evaluation, attitude, and teaching content on children's painting learning. The learning process of children's fine arts courses and children's paintings determines the results of children's course learning (Eisner, E. W., 2017). There is not a relatively independent relationship between the painting courses and the children's ability to paint. At the same time, the expression form of children's paintings is related to the knowledge acquired by children in fine arts courses. Therefore, there is a correlation between the teaching content of fine arts teachers and children's painting ability. The child-centered curriculum theory mentioned that children's behavior in painting is determined by the level of children's self-development (Lowenfeld, V., 1960 & 1987). But in discipline-based art education, fine arts teachers and children are both the main part of fine arts curriculum education. From the children's test results show in children's consciousness fine arts teachers and fine arts courses are both the factors affect the results of their painting creation. Therefore, it can also be shown that in children's art education, discipline-based art education is more suitable for children's fine arts learning than children centered curriculum. The teaching content and teaching direction of fine arts teachers have a positive impact on children's painting learning.

3.5. Conclusions and Suggestions

In terms of children's painting creation learning, as children grow older, children gradually show a negative attitude about the guidance of fine arts teachers. The reason for this result is that children's imagination of painting has changed with the growth of children. Also, children's subjective awareness of painting creation increases with age. This is also the reason why children's attitude about fine arts teachers' guidance has gradually become negative. Therefore, fine arts teachers need to consider children's age and the arrangement of fine arts courses when guiding children's painting creation. For example, some poster design courses, book cover design courses, illustration courses,

etc. are arranged in school fine arts courses. Fine arts teachers can guide students to accept the teachers' guidance and suggestions through these special courses. Children can also improve their artistic creativity in the process of learning new forms of artistic creation. Fine arts teachers' suggestion of children's paintings affects the effect of children's painting learning. The well suggestion can increase children's interest in painting creation. Therefore, the well suggestion of fine arts teachers on children can promote the motivation of children's painting creation learning. In addition, the communication methods of fine arts teachers in the process of communicating with children will also affect the effect of children's painting learning. If the art teacher uses a serious tone to communicate with the child, then the child is easily caught in anxiety and this negative emotion will also affect the child's drawing learning effect. The learning atmosphere of the school fine arts classroom will also affect children's painting learning. A relaxed and pleasant classroom atmosphere can help ease children's nervousness. For some children with weak drawing ability, a relaxed classroom learning atmosphere can help children quickly enter the learning state.

Chapter 4: The Impact Test of Parents on Children's Painting

4.1. Introduction

The learning process of children's painting creation is achieved through school education and after-school practice. School fine arts courses provide children with painting techniques and knowledge. The process of painting practice after class is to help children improve their ability to apply painting techniques. Also, the process of painting practice after class is a process to help children understand the knowledge of painting. The significance of school fine arts courses is to provide children with the direction and method of painting creation. School painting education can help children fully understand painting knowledge and painting techniques. Painting practice after class is to help children improve their painting ability. Fine arts teachers focus on expanding children's knowledge in school painting courses. So most of the children’s after-school painting exercises are done at home. Parents' attitude about children's painting learning determines the children's learning outcomes. Parents' companionship and guidance can help children get inspiration for painting creation when children practice painting at home. For example, some parents will pass on their painting experience and life experience to children and they will find ways to create painting together with children. In the process of children's painting learning, parents' understanding of children's painting learning and the activities of parents and children in painting learning can help children improve their painting skills. The subjects of this part are the parents of children aged 7-13. The influence of parents on children's painting learning is studied from the five aspects of parents' input, attention, companionship, understanding and expectation.

Children's access to knowledge mainly comes from school, society and family. Children's cognition of social environment comes first from their parents. Under the guidance of parents, children will experience the visual characteristics of different

natural scenes and life scenes. At the same time, children's observation and description of the appearance of different characters began under the guidance of their parents. Children's performance in learning also originates from their parents. Children build their own learning methods by observing and imitating the learning methods of their parents. In the process of children's growth, children's cognitive ability is also built with the help of parents. For example, when some parents describe the appearance characteristics of objects to children, parents will combine their own knowledge of the shape of the objects to explain. Parents' effective guidance and support when children are learning can help children get better learning results. Children's learning begins with imitation. They will transform what they see into different graphics (Carlsson, M., et al., 2015). These figures represent children's cognition, understanding and evaluation of objects (Rui, Y., 2015). Evaluations from parents can change children's perception of learning (Chatzipanteli, A., et al., 2014). Parents' helping children build correct self-awareness can help children to clarify their goals of behavior and learning. If parents give positive evaluations to children, they can motivate children to complete their learning tasks better. If parents give children an unreasonable evaluation, the children will deviate from the learning goals and the children will not be able to complete the learning tasks. Children's paintings are one of the representations of children's schema cognition. Children aged 7-13 already possess realism in things (Cliffordson, C., et al., 2008). Children's paintings can reflect children's psychological state. Therefore, children's living environment will affect children's paintings.

Children's growth environment (including living environment and learning environment) affects the content and style of children's paintings (Freedman, K., 2003). In the process of children's painting creation, children will record what they observe in their paintings. The formation of children's painting style is related to children's painting learning environment (Tuttle Jr, F. B., 1985). The style of their paintings will be influenced by the educational content they receive. If children often learn the

relevant knowledge of a certain style of painting (such as abstract painting, free sketch painting, and impression painting) during the learning process of painting knowledge, the style of children's painting works will also be affected by the learning content. Therefore, the content of children's paintings reflects their growing environment. Parents' guidance to children is closely related to children's future learning achievements (Dustmann, C., 2004). A free painting learning environment can help children easily create paintings. The relaxed learning atmosphere can help children reduce the tension in painting creation. For some children who are not good at painting, they will feel nervous and anxious when they draw. Parents' company can help children reduce their resistance to painting. At the same time, a well family learning atmosphere can ease children's anxiety. Parents' observation of children's behavior during painting practice can help children solve the reasons for children's resistance to painting. By observing the process of children's painting creation, understand which parts of the painting process are easy to stimulate children's interest in painting and use these factors to guide children to complete painting creation. In the process of children's painting creation, if children think that the process of painting is interesting, children's painting learning participation is high. Therefore, parents' understanding of children's preferences in painting can better guide children to participate in painting practice.

Parents' attitudes about children's learning to paint affect the outcome of children's painting learning (Konzal, J. L., 1997). If the parents have a positive attitude towards children's painting learning, then these parents will spend some time managing children's learning habits and content. At the same time, in this process, it can help children establish a positive attitude about painting creation. On the contrary, if parents neglect children's painting learning, it will also have a negative impact on children's painting learning. Parents play a supervisory role in children’s post-painting exercises (Madjar, N., et al, 2016). For some children with poor self-management ability, due to lack of management of fine arts teachers, they are unable to focus their attention on

painting exercises after class. It will also affect the efficiency of children's painting learning. In this case, if the parents supervise the children's painting exercises, they can help the children establish well painting learning habits. Parents' attention to children's painting learning also affects children's attitude towards painting learning (Upitis, R., 2001). Parents play a role model in children's growth. Children will imitate their parents' behaviors and attitudes (Desforges, C., 2003). Parents' attitudes towards children's learning to paint will also affect children's interest in learning to paint. Parents ’positive attitudes can help children build awareness and attitude towards painting. Therefore, parents' attitude about children's painting learning will affect children's learning attitude.

4.2. Background

Parents ’investment in children ’s learning (such as parents’ investment in funds, time, and educational resources) and judgment (parents ’decision on children ’s learning behavior) determine children ’s learning outcomes (Coleman, JS, 2018). Parents provide children with learning resources, learning funds, and learning environments. These conditions are the external conditions and basic conditions for children to learn. Learning resources, funds and environment are also essential factors in children ’s learning process. When children learn from the beginning, their initial learning goals and directions are formulated with the help of their parents (Ambert, A. M., 2001). For example, parents will help children screen the content of learning, teachers and schools that guide children in learning. Parents' choice of children's learning direction affects children's learning content. In a family with a well learning atmosphere, parents will develop children’s learning awareness by demonstrating their own performance in learning. Children in this type of family environment will also imitate the behavior of parents and consciously invest in learning. Therefore, parents' attitude towards learning affects children's learning goals and directions. Parents’ company can help children find

and solve problems in the process of children's painting learning (such as learning habits, problems in completing painting tasks and understanding of fine arts knowledge) (O'Toole, L., et al., 2019). At the same time, in this process, parents can help children better understand the learning content and learning tasks. Parents will know the influence of external factors (such as learning environment factors and children's comprehension factors) on children's drawing learning during communication with children. Through this communication process, it helps children to alleviate the trouble of painting learning caused by external factors.

In terms of painting practice time used by children, most of the time in school fine arts courses is used for the training of children's painting skills and learning of painting knowledge. Therefore, the task of children's painting practice is mainly completed after class. Children spend more time in painting practice at home than when children receive painting education in school. There is a positive correlation between student learning time and student learning achievement (Jez, S. J., et al., 2015 & Yeşil Dağlı, Ü., 2019). The more time a child invests in after-school painting exercises, the faster the child's painting ability improves. Parents' companionship in after-class painting practice can help children find out the problems they have encountered in the application of painting techniques (such as the proportion of objects in painting, application problems of color and composition creation problems). Therefore, parents accompanying children to learn painting can effectively help children improve their ability to create paintings. The communication between parents and children in painting learning can make parents more clearly understand the children's learning status and help children solve the difficulties encountered in the painting process. Parents' accompanying children in learning can help children develop well learning habits (Elder, T. E., et al., 2009). For example, parents help children plan the time of daily painting practice, and help children build awareness of independent learning by stipulating the children 's painting learning time. Well painting learning habits can also help children change their

problems during painting practice (such as attention problems, concentration problems and learning endurance problems). With the support of well painting learning habits, children constantly improve and practice to achieve the learning effect of improving painting ability.

As children grow up, children's perception of painting also changes. Children's paintings represent the development of children's behavior and emotions. Children use scene paintings (such as paintings with life scenes, school scenes, and family scenes) to record their performance in daily life (Malchiodi, C. A., 1998). Parents can judge children's emotional state by observing the details in children's paintings (such as the expressions and postures of the characters in the paintings, the overall color tone of the paintings, and the positional relationship of different objects in the paintings). Parents can also understand children's growth status by observing children's paintings. For example, some children will show the objects or characters they care about in their paintings (Malchiodi, C. A., 1998). Under the influence of the family environment, some learning experiences from parents provide some learning foundations for children's painting learning (Hornby, G., et al., 2011). Parents will teach them how to observe objects and creativity ideas to provide children with ideas for painting creation. Therefore, parents play a guiding role in the process of constructing the learning foundation of painting together with children and parents, and also determine a part of children's learning results. Children's self-awareness determines children's will and creativity in painting learning (Hedegaard, M., 2009). The formation of children's self-consciousness is related to the guidance of parents. Children in elementary school form their self-awareness in the interaction with their environment. Therefore, the fine arts learning environment created by parents for children plays an important role in the development of children's painting learning.

Children's academic performance is closely related to parental support. A well family education and family learning atmosphere can help children improve their

learning ability (Fan, W., et al., 2010). The process of family education is the process by which parents help children build learning awareness. A well family learning atmosphere can help children maintain a well learning state (such as children's concentration, learning efficiency and learning motivation). Children who study with their parents can acquire more knowledge than those who do not study with their parents (Stroetinga, M., et al., 2019). Parents will pass on their learning experience to children when they accompany them to learn. At the same time, parents will pass on the knowledge they know to children to help children expand the scope and content of learning. In addition, parents' investment in children's learning also affects children's painting learning (Meier, C., et al., 2019). If parents can meet the needs of children's daily painting, children can get better learning results. On the contrary, parents' investment in children's painting learning cannot meet the needs of children's painting learning. Children will not get well learning results. Parents' demands on children in family education also affect children 's learning effectiveness (Anderson, K. J., et al., 2010). Parents' high or low demands on children's learning results will affect children's learning effect (Goodall, J., et al., 2014). Therefore, the factors that affect children's learning achievements in home painting learning include the level of parents' attention to children's learning, the level of parents' accompanying children's learning, the degree of parents' investment in children's learning, the expectations of parents for children, and the understanding of children's painting ability. These factors will affect the results of children's painting learning.

4.3. Methods

4.3.1. Content for the Test

This study used a questionnaire survey method to test parents' attitudes towards from ten questions (Appendix B, Questionnaire 2) respectively are parental support (Question 1) , guide children to get draw inspiration (Question 2) , parents' comments

on children's paintings (Question 3) , cultivation of children's painting ability (Question 4), cultivation of children's painting creativity (Question5) , cultivation of children's painting imagination (Question 6), observation of children's painting habit (Question 7), parental communication and encouragement (Question 8), discuss the content of the painting with children (Question 9), parents' requirements for children's painting creativity (Question 10), accompany children to finish painting (Question 11), support children's after school painting learning (Question 12), and support children having after school painting practices (Question 13).

4.3.2. Participants

In this study, the questionnaire survey was used to test parents who have children aged 7-13 years old. Table 7 shows the distribution of the participants' gender, age and degree. The questionnaire is divided into five test directions: parents' importance to children's learning (Question 1, 3 and 10), parents' accompanying children's learning (Question 2 and 11), parents' devotion to children's learning (Question 12 and 13), parents' expectation of children (Question 4, 5 and 6) and parents' understanding of children's painting ability (Question 7, 8, 9). Also, this study will analyze the influence of parents on children's painting learning by combining the age, gender and educational background of participating parents.

Table 7. Age, Gender, and Degree Distribution

		Percent	**Frequency**	**Total**
Age	31-40 years old	42.4	643	
	41-50 years old	31.3	474	
	25-30 years old	26.3	398	
Gender	Man	51.9	786	1515
	Woman	48.1	729	
Degree	Middle School	5	76	
	High School	9.8	148	

Junior College	45	681
Undergraduate	34.3	519
Master or above Master Degree	6	91

Note. This table shows the age, gender, and degree distribution of parents participating in the test.

4.3.3. Requirements for the Painting Cases

The painting cases used in this part of the study is divided into 3 comparative groups. The data of these three comparison groups comes from the painting works of children's after-school painting practice. Each comparison group is composed of children's painting practice works with parental companionship and children's painting practice works completed independently. Considering that children of different ages have different levels of knowledge, so painting cases are divided into three comparative groups according to children's ages and knowledge levels. Children aged seven to nine years old have just started to study in the primary school curriculum. Most of the content of children's paintings at this stage is about the depiction of life scenes. So, the event scene painting of children aged seven to nine was selected as one of the comparative group (Figure 21 and 22). Children aged nine to eleven years old has received several years of primary school education they have learned the related knowledge about the natural environment at school. So the natural scene paintings completed by nine to eleven years old children have sealed as the comparative cases (Figure 23 and 24). Children aged eleven to thirteen years old have higher painting experience and knowledge levels than the other two age groups. And children at this age have a clear direction for painting creation. The creation of imagination painting has certain requirements for children's thinking and thinking level. So the imagination painting of eleven to thirteen years old children was selected as the comparison group (Figure 25 and 26).

4.3.4. Results

All data in this section was analyzed using SPSS. Before the data analysis, in order to ensure the reliability and relevance of the content of the questionnaire, all the data were analyzed and correlated (Table 8). From the value of Cronbach's Alpha value of 0.901, it can be proved that the parents who participated in the test all answered questions based on their actual situation. Therefore, the test results of all questions in the questionnaire are reliable. The value of 0.948 from KMO and Bartlett's Test shows that each question in the questionnaire truly shows the characteristics of the variables and meets the criteria for continued analysis.

Table 8. Reliability and Correlation Analysis

Result of Cronbach's Alpha and KMO		
N of Items		13
Cronbach's Alpha		.901
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.948
Bartlett's Test of Sphericity	Approx. Chi-Square	7740.984
	df	78
	Sig.	.000

Note. This table shows the result of Cronbach's Alpha (0.901) and KMO (0.948).

In order to test whether parents of different genders with different attitudes of the six measurement items (Parental Support, Parental Communication and encouragement, Cultivation of Painting Ability, Cultivation of Painting Imagination, Parents' Comments on Children's Paintings, Parents' Requirements for Children's Painting Works). So a comparative analysis of the average test results of participants of different genders was conducted (Table 9). From the analysis result $P < 0.05$, it can be proved that the attitudes of different gender samples to the six test items all show significant differences. And through the comparison of the average of the six measurement items,

it can be seen that the mother of the child has a more positive attitude to the child's painting learning and the degree is higher than the father of the child.

Table 9. Differences in Attitudes of Different Genders

Variables	Gender (average value± standard deviation)		*F*	* *p*
	Male (N=786)	**Female**(N=729)		
Parental Support (Question 1)	4.85±1.75	5.06±1.68	5.914	0.015*
Cultivation of Children's Painting Ability (Question 4)	4.70±1.69	4.88±1.66	4.450	0.035*
Cultivation of Children's Painting Imagination (Question 6)	4.92±1.76	5.15±1.72	6.544	0.011*
Observation of Children's Painting Habit (Question 7)	4.79±1.73	5.00±1.72	5.389	0.020**
Parental Communication and Encouragement (Question 8)	4.99±1.81	5.19±1.73	4.709	0.030*
Parents' Requirements for Children's Painting Creativity (Question 10)	5.21±1.77	5.44±1.60	6.971	0.008**

Note. The result * $p<0.05$ shows different gender samples have difference attitudes towards to six measurement items

Parents of different ages have different educational concepts, so by comparing the test results of three age groups of 25-30 years, 31-40 years and 41-50 years, analyze the differences of parents' attitudes towards supporting children's painting creation and cultivation of children's painting creativity (Table 10). According to the results of the *P* value, it can be proved that the parents of different ages have significant differences in attitudes to supporting the children's painting creation and cultivation of children's painting creativity ($P < 0.05$) (Table 10). Parents of different ages showed significant differences in their attitudes towards supporting children's painting creation ($P = 0.031 < 0.05$). By comparing the average values of attitudes of different ages, parents of different ages all support children to learn to paint. And the support of parents aged 31-40 years is higher than that of the other two age groups.

Table 10. Differences in Attitudes of Different Ages

Variables	**Age** (median/ average value)			**Kruskal-Wallis test statistics**	* *p*
	31-40 (N=643)	**41-50 (N=474)**	**25-30 (N=398)**		
Parental Support (Question 1)	5.000/5.07	5.000/4.93	5.000/4.79	6.941	0.031*
Cultivation of Children's Painting Creativity (Question 5)	5.000/4.83	5.000/4.51	5.000/4.55	8.633	0.013*

Note. The result * $p<0.05$ shows different gender samples have difference attitudes towards to two measurement items.

Parents with different degree backgrounds showed significant differences in attitudes about cultivation of children's painting creativity and children's encouragement (P <0.05) (Table 11). By comparing the median results, it can be proved that parents with higher educational background pay more attention to the cultivation of children's painting creativity. Parents with education level below junior high school pay less attention to the cultivation of children's drawing creativity. Parents with higher academic qualifications are more willing to communicate with children about the content of painting and more willing to encourage children to learn painting.

Table 11. Differences in Attitudes of Different Degree Background

Variables	**Degree** (median)					Kruskal-Wallis test statistics	***p**
	Middle School	High School	Junior College	Undergraduate	Master or above Master Degree		
Cultivation of Children's Painting Creativity (Question 5)	3.000	4.000	5.000	5.000	5.000	60.910	0.000 **
Parental Communication and Encouragement (Question 8)	4.000	4.000	6.000	6.000	6.000	41.741	0.000 **

Note. The result * p<0.05 shows different degree background samples have difference attitudes towards to two measurement items.

According to the correlation coefficient results in Table 12, it can be seen that there has a positive correlation between accompany children to finish painting and the

three factors (help children obtain painting inspiration, understand children's painting habits, and evaluate children's painting works).

Table 12. Correlation Coefficient Results

		Accompany Children to Finish Painting (Question 11)
Guide Children to Get Draw Inspiration (Question 2)	Correlation Coefficient	0.296**
	p value	0.000
Parents' Comments on Children's Paintings (Question 3)	Correlation Coefficient	0.373**
	p value	0.000
Observation of Children's Painting Habit (Question 7)	Correlation Coefficient	0.348**
	p value	0.000

Note. * $p<0.05$ ** $p<0.01$

In order to test the correlation between parents' attitude about children's after-school painting learning and the parents' attitude about the development of children's painting ability, this part calculated the correlation coefficients of these two factors. According to the result of Table 13, the correlation coefficient = 0.457, p <0.01 shows that there is a positive correlation between these two factors. The correlation coefficient between parents' attitudes about children's after-school painting learning and their attitudes about children's creativity in painting is 0.345, p <0.01. So, there is a significant positive correlation between these two factors. The correlation coefficient between the parents' attitude towards children's after-school painting learning and the cultivation of children's imagination of painting creation is 0.478, p <0.01. Therefore, there is a positive correlation between these two factors. Combining the above results

can prove that parents who support children's painting learning after class also pay attention to the cultivation of children's painting ability, painting creativity and imagination.

Table 13. Correlation Coefficient Results

		Support Children's After School Painting Learning (Question 12)
Cultivation of Painting Ability (Question 4)	Correlation Coefficient	0.457**
	p value	0.000
Cultivation of Children's Painting Creativity (Question 5)	Correlation Coefficient	0.345**
	p value	0.000
Cultivation of Painting Imagination (Question 6)	Correlation Coefficient	0.478**
	p value	0.000

Note. * $p<0.05$ ** $p<0.01$

Parents who support children's painting practice after class also spend time discussing the content of children's painting works with children (according to the result of correlation coefficient = 0.465, $P < 0.01$, it is proved that there is a positive correlation between the two factors of supporting children having after-school painting practice and discussing the content of the painting with children) (Table 14). At the same time, according to the result of correlation coefficient = 0.481, $P < 0.01$, it is proved that there is a positive correlation between the two factors (support children having after school drawing practices, and pay attention to children's painting ability). Therefore, parents who support children's painting practice after class pay attention to children's painting ability.

Table 14. Correlation Coefficient Results

		Support Children Having After School Painting Practices (Question 13)
Cultivation of Children's Painting Ability (Question 4)	Correlation Coefficient	0.481**
	p value	0.000
Discuss the Content of the Painting with Children (Question 6)	Correlation Coefficient	0.465**
	p value	0.000

Note. * $p<0.05$ ** $p<0.01$

4.3.5. Cases Analysis of Children's Paintings

The improvement of children's painting ability is determined by the results of children's classroom learning and after-school practice. By analyzing the lines, composition, spatial relationship and decorative patterns in children's paintings, teachers and parents can understand the children's painting practices. In this part, three comparative groups (Figure 21 and Figure 22 is comparative group 1, Figure 23 and Figure 24 is comparative group 2, Figure 25 and Figure 26 is comparative group 3) are selected for a total of six children Works as an example of analysis. And use case analysis method to analyze the gap between the children's practice work without parents' accompany and the practice work completed under the parents' accompany. Figure 21, 23, and 25 show the paintings completed by children accompanied by their parents. Figure 22, 24, and 26 show the paintings completed by children without parental accompanied. The cases used in this part are divided into three types according to the content of paintings: event scene painting (Figure 21 and Figure 22), natural scene painting (Figure 23 and Figure 24), and imagination painting (Figure 25 and Figure 26). Children who are accompanied by their parents practice the painting skills better than those who independently complete the painting exercises. Children who practice with

their parents pay more attention to the description of the details of the objects in the paintings. In the process of children's painting practice, parents will help children find out some of the appearance features they overlook during the observation of objects. For example, when a child creates a painting (Figure 21), the child ’s parents will remind the child to pay attention to the decorative pattern of the umbrella, the arrangement of raindrops, and the details of the tree. At the same time, according to this work, it can be proved that parental companionship can help children improve the ability of painting composition and expression. On the contrary, children who independently complete painting exercises will ignore the detailed description of the objects in the painting (Figure 22). It is difficult for children without parents to find problems in their paintings (such as the positional relationship of different objects in the painting, the depiction of the shape characteristics of the objects and the decorative patterns of the objects).

When children create paintings of natural scenes, parental companionship can guide children to learn the growth process and morphological characteristics of plants. Figure 23 This work was completed by children accompanied by their parents. Before the children created this work, the parents of the children introduced the growth environment and morphological characteristics of the plants to the children. The details of plants in paintings (such as the roots of plants, the shape of petals, the shape of leaves, etc.) can prove that parental companionship can help children improve their observation ability. At the same time, parental accompany learning can also help children understand the relevant knowledge of painting. In contrast, children without parental companion practice have weaker cognitive abilities to plant shape characteristics. In Figure 24, the differentiating characteristics of different types of plants are lower. Judging from the shape of petals, the shape of flowers and leaves and the growth direction of plants in the works, this kind of children will ignore the detailed characteristics of plants in the process of observing plants. At the same time, it can

prove that children lack the learning process of learning related plant knowledge before painting creation. Therefore, accompanying study of parents can help children improve their ability to create paintings.

Children's creative direction and creative thinking influence the content of their paintings. When children create imaginary paintings (such as science-fantasy-themed paintings), the content involved in such paintings is something that children rarely encounter in daily life. When children create such works, they may not be able to complete the paintings because they do not understand the relevant knowledge of the creation theme. Parents' experience and knowledge can provide children with ideas for painting creation. For example, before a child creates a work on a science and technology theme, parents will explain to the child how to use mechanical equipment, the direction of application, and how it works. In the process of creation, children combine the knowledge provided by parents to children to create paintings. Figure 25 is a painting completed by children with the help of their parents. From the details of the paintings (the robot's control buttons, the robot's working environment,) can prove that parents guide children to learn the relevant background knowledge of the painting theme can provide children with inspiration and direction of painting creation. At the same time, due to the knowledge of children's creative subjects, children's paintings are strongly related to each other. On the contrary, the children (Figure 26) who don’t have their parents to accompany them to complete the painting creation have weak ability in designing painting scenes and depicting details of objects in paintings. Therefore, parents accompanying children to complete the painting creation has a positive impact on children's ability to paint.

Figure 21. Event Scene Painting Completed with Parental Companion

Note. This is a child's event scene painting completed with parental companion.

Figure 22. Event Scene Painting Completed without Parental Companion

Note. This is a child's event scene painting completed without parental companion.

Figure 23. Natural Scene Painting Completed with Parental Companion

Note. A natural scene painting completed by a child with parental companion.

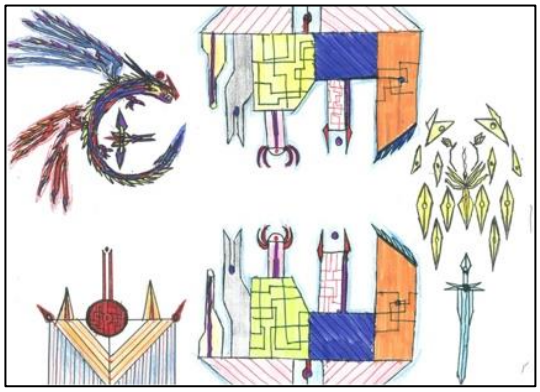
Figure 24. Natural Scene Painting Completed without Parental Companion

Note. A natural scene painting completed by a child without parental companion.

Figure 25. Imaginary Paintings Completed with Parental Companion

Note. An imaginary painting completed by a child with parental companion.

Figure 26. Imaginary Paintings Completed without Parental Companion



Note. An imaginary painting completed by a child without parental companion.

4.4. Discussion

This part of the study tested the influence of parents on children's painting creation and learning. The results of the questionnaire test show that parents' encouragement and companionship have a positive impact on children's painting creation. This result is the same as that of other studies on the relationship between parental support and children's learning achievement at school (Areepattamannil, S., 2010). So, parental encouragement and support can help children to build interests in painting creation and learning. There have connections and restrictions between the growth of children and children's family growth environment (Bronfenbrenner, U., 1994 & Holden, G. W.,

2014). Children's family growth environment is created by parents. Children's family growth environment is determined by their parents' educational concepts, education level, and parents' attitudes towards children (Bronfenbrenner, U., 1994). The test results of parents' attitudes towards children's painting learning show that the higher the parent's education level, the more willing they are to support children's participation in drawing learning. Therefore, the education level of the parents will also affect the children's attitude towards painting learning and creation. It can also show that there have connections and restrictions between children's painting learning and children's family growth environment. The results of family education are reflected in children's thinking style, cognitive level, and educational level (Miller, S. A., 2016). From the case analysis of children's paintings, it can be seen that the parenting style of children will also affect children's painting learning and creation. The family education model divided into companion education, encouragement education, and monitoring education (Holden, G. W., 2014). In this part of the study, the impact of parental companionship and encouragement on children's painting learning and creation has studied. But it lacks the influence of parental monitoring on children's painting learning and creation. In the future, the study direction will be invested in the influence of parental monitoring on children's painting creation and learning.

4.5. Conclusions and Suggestions

From test results can prove that parents of different ages, educational backgrounds, and genders have a positive attitude towards children's extracurricular painting exercises. This can also prove that most parents support children to practice painting outside of class. Parents' accompanying drawing practice has a positive impact on children's painting creation. In the process of children's painting learning, parents pay attention to the cultivation of children's drawing ability. Parents with higher academic qualifications pay more attention to children's painting learning. Higher-educated

parents pay more attention to the cultivation of children's painting creation than lower-educated parents. Children's mothers pay more attention to children's painting learning than children's fathers. Under the guidance of parents, children can effectively improve children's observation ability and painting ability. Parental accompany learning can help children improve the visual effects of their paintings (such as the details of objects in paintings, the correlation between different objects in paintings, and the accuracy of the appearance characteristics of objects in paintings). Parents accompanying children in painting exercises can also help children improve their painting skills. And in the process of parental companionship, children can also learn the knowledge of other disciplines (such as natural knowledge, scientific knowledge and common sense of life, etc.). Therefore, parents' participation is important in the process of children's painting creation. In addition, if children only rely on painting in the classroom, it is for them to learn how to improve their drawing skills. Because children spend most of their time in the classroom learning painting skills and fine arts knowledge, moreover, they have limited time to practice the application of painting techniques in school fine arts courses , they need to rely on after-class painting practice to improve painting skills. Only the three aspects of the school's painting learning, extracurricular painting practice and parent's participation cooperate can help children improve their painting ability.

Chapter 5: The Impact Test about the Usage of Painting Materials in Children's Painting Works

5.1. Introduction

The use of painting materials indicates the aesthetic abilities of painting learners (painting learners' assessment of the shape characteristics of objects and the overall style of painting works) Painting learners use different painting materials to show the appearance characteristics of objects (such as texture characteristics and color characteristics of objects). Cognitive attributes of the creator's society and emotion exist in paintings (Blatt-Gross, C., 2010). Children express their emotional sensibility by controlling the color tone of the paintings, the emotions of the characters in the paintings and the depiction of the scenes of the paintings. Different painting materials will make children's paintings display different artistic effects. The use of painting materials in a painting determines the artistic form of the painting. Use rough-textured drawing paper (such as jute paper, creping paper, linen) and rough-textured paintbrush (such as crayon, oil pastel, acrylic pigment, gouache pigment). The paintings created have more imagery features (such as abstract paintings and decorative paintings). The use of delicate texture paper (such as sketch paper, card paper, watercolor paper) and fine texture brush (such as color pen, pencil) is more suitable for expressing the detailed features of objects. The artistic style of paintings created with such materials is realistic (R. J Gettens, et al., 1966 & Topal, C., 1992). In children's daily painting practice, most children are accustomed to using color pens or color pencils for painting (Golomb, C., 2003). Because the texture effects of color pens and color pencils are used to display details of objects in paintings, this also affects most children's paintings to be more realistic (Malchiodi, C. A., 1998). The use of painting materials with different textures will make children's paintings show different painting styles. Therefore, learning to use

different painting materials for painting creation can help children improve the visual effects of their paintings.

The artistic conception expressed by different painting materials is different. Different painting materials can provide painting learners with more expressive direction of painting creation (Lubart, T., et al., 2006). For example, in terms of color expression of paintings, color pen and acrylic pigments have higher saturation of colors, so this type of painting material is suitable for paintings with strong color contrast (Malchiodi, C. A., 1998). In the creation of figure paintings, in order to express the material characteristics (such as woolen, artificial wool) of the figures in the paintings, creators will use jute paper, creping paper, and linen to express the texture characteristics of the clothes (Gardner, H., 1973). Therefore, the visual effects of paintings composed of painting materials with different textures are also different. At the same time, using different painting materials for painting creation can also help painting learners to establish their specific painting language (such as lines, color, and the shape of the objects) and painting characteristics (such as the form and types of paintings). Instructing children to use different drawing materials in the teaching process of children's drawing helps to cultivate children's creative ability and awareness (Durlak et al., 2011). Before children learn to use different painting materials, children need to understand the functions, uses and methods of painting materials. Learning the application skills of different painting materials can also help children learn more painting techniques. While children have mastered the knowledge of these technologies, the direction of children's painting creation has also increased. Also, children can exercise children to create paintings with different visual effects in the process of trying to use different painting materials. Therefore, the use of different painting materials can help children improve the visual expression and creativity of their works.

The process of children learning different painting materials application techniques is also the process of improving children's imagination, creativity,

observation, and drawing abilities. Learning the characteristics of painting materials (colors, shapes and texture effects of painting materials) and the application scope of different painting materials can also help enhance children's artistic creative thinking. Painting materials determine the artistic style of paintings (Wehlte, K., 1975). Therefore, there is a correlation between the painting materials and the artistic style of the paintings. Art learning can help children improve their cognitive level of knowledge (Graham 2015). For example, in the process of cultivating children's modeling ability, children must first learn the observation method of objects, the cultural content represented by objects and the existence value of different objects. While developing their drawing skills, children also learn relevant cultural knowledge. Therefore, the study of fine arts courses has a positive influence on the cognitive level of children's knowledge. In fine arts courses, image knowledge is easier to understand by children than painting theory knowledge. Fine arts learning can help children improve their cognition of knowledge (Graham 2015). For example, in the process of cultivating children's modeling ability, children must first learn the observation method of objects, the cultural content represented by objects and the existence value of different objects. While developing their drawing skills, children also learn relevant cultural knowledge. Therefore, the study of fine arts courses has a positive influence on the cognitive level of children's knowledge. In fine arts courses, image knowledge is easier to understand by children than painting theory knowledge. In the process of learning children's theoretical knowledge of painting techniques, painting terminology and knowledge of painting theories that are not easy to understand will lead to children's inattention and lose interest in learning. Learning motivation in children ’s learning can help children maintain their interest in learning (Marshall 2014). Guide children to use different painting materials for painting creation and learn to understand painting theory knowledge in the process of applying painting materials to achieve the purpose of stimulating children's learning motivation in this way. At the same time, trying to use

painting materials of different materials can also help children maintain interest in painting. Fine arts teachers can provide a painting learning atmosphere through different forms of painting creation to help children build awareness of learning painting actively.

Different painting materials provide different visual effects for children's paintings. The coverage of watercolor on paper is weak. Paintings created with watercolor can show the original texture effect of the paper. This type of material can make the objects in the paintings show a transparent texture. Watercolor pigments are water-soluble pigments. When children use such materials to create, the proportion of water and pigments will make the visual effects of paintings variable and random. It is not easy to control during the use of such pigments. Children use watercolor paint in their paintings to make their paintings show natural visual effects. However, it is difficult for some children with weak drawing ability to control the color change of water-soluble materials. The perspective relationship of paintings created by children using such materials is not clear. The oil paint stick and acrylic material have strong covering ability on the drawing paper. Therefore, the texture effect of paintings created by children using such materials is determined by the method of using paint and brushstrokes. And such materials have higher saturation and brightness. Therefore, the color contrast of paintings with oil pastels and acrylic materials is stronger. In paintings created using two materials, the spatial relationship between different objects is clear. However, due to the complicated use of acrylic materials, the utilization rate of such materials in children's paintings is low. The color brightness and purity of children's paintings created with colored pencils are lower. Therefore, the color contrast of works with such painting materials is weak.

5.2. Background

Painting materials are the basis for artists to express their artistic language. Painting materials also support the artistic characteristics of paintings. Art works are a fusion of aesthetics and emotions (Saarinen 2019). The expression of any kind of artistic emotion needs to be revealed with the aid of the materials that exist in life. The painter expresses their feelings and ideas through the facial expressions of the characters, scene environment, and objects arrangement in the painting. Similarly, the content of children's paintings is also derived from things familiar to children (such as natural environment, living environment and learning environment) (Efland, A., 1976). Painting materials are the medium through which people express emotions, experiences, and life experiences (Maiese 2016). At the same time, painting materials are also research information that can be directly obtained by people in painting works. Painting researchers can judge the artistic characteristics of paintings based on the texture and color of the detected painting materials. The study of painting materials is not only limited in aesthetic research. Researchers classify paintings based on the characteristics of the painting materials in the paintings (Bianco et al. 2019). For example, classify the artistic style of paintings according to the texture features of the painting materials (Selim, A., et al., 2016). The types of paintings are classified by the strokes generated by the painting materials in the art works (Sheng, J., et al., 2014). Painting materials can also help people study the time when paintings exist. Also, analyze the age of paintings based on the spectral characteristics of the painting materials (Ortiz-Herrero et al. 2019). According to the composition, texture characteristics and color characteristics of the painting materials, the damaged paintings can be repaired (Magon and Lama 2019). Therefore, the basis for studying the characteristics of paintings is to study the painting materials in paintings.

Painting is one of the ways children express emotions, life experiences and cognition (Chen 2018). The focus of children's drawing education is not only to help

children improve their drawing skills but also to help children build creative thinking. In the process of educational practice, fine arts teachers often ignore the cognitive level and emotional experience of children (Erickson 2004). Children will be exposed to some painting techniques and professional terminology in the process of learning painting creation. These contents are the key to children's drawing learning. Therefore, children's cognitive level determines the effect of children's painting learning. Painting practice training activities can help children understand painting-related knowledge during the painting experience. In the process of teachers guiding children to use painting materials, letting children feel the characteristics of painting materials freely will help children get more cognitive experience. Extensive use of experiential teaching in painting education will improve students' learning effect (Duncum 2002). Most of the children's learning results in drawing are influenced by children's psychological factors (Liao 2016). The lines, composition and colors in children's paintings can reflect people's psychological state and personality characteristics. For example, children use dark blue, black, or dark brown to express their frustration (Golomb, C., 2003). Some children are used to expressing children's attitudes towards people they are familiar with through the positional relationship of different characters in paintings (Malchiodi, C. A., 2013). Art creation and human consciousness are connected (Markova 2019). When a child faces an objective object image, the information of the object image is immediately combined with the child's subjective consciousness. Therefore, children's experience of painting materials in children's painting education can help children enhance their creative ability in painting.

The application of different painting materials has an enlightening effect on children's creativity in painting (Morrison, G. S., 2007). When children use recycled materials (such as wrapping paper, newspapers, plastic products, etc.) to create collages, children need to associate items with similar textures to recycled materials. Then use these materials to create collages. When children use painting materials, they will think

about the influence of different painting materials on the visual effect and painting style of the painting. In this process of thinking, it can also help children establish the direction of painting creation and the style of painting. When children try to use different painting materials, children need to learn how to use painting materials and their scope of application. The training on the use of painting materials needs to be carried out simultaneously with the training of painting techniques. Because children use painting materials for painting creation, they also need to consider the proportion of objects in the painting, the composition of the painting, and the color tone of the painting. Therefore, the application training of children's drawing materials is also the training to cultivate children's drawing ability. The use of different painting materials determines the category of paintings (Gettens, R. J., et al., 1966). For example, pencils should be used for sketch creation, acrylics should be used for oil painting creation, and crayons, watercolors, and colored pencils should be used for children’s drawings. Therefore, children's knowledge about painting materials can also help children understand relevant knowledge about painting styles.

From the children's paintings, it can be seen that the painting materials that children often use in the process of painting are color pens, colored pencils, pencils, crayons, and oil pastels (Malchiodi 1998; Lowenfeld 1987 & Jolley, 2009). Due to the difference in texture between different painting materials, most children will use no more than two painting materials (Jolley 2009). In the process of learning to use painting materials, children will find it difficult to arrange different painting materials together. From many children's paintings, it can also be seen that there are gaps in the use of different types of painting materials (Kraft et al. 2018). For example, when children use both color pen and color pencil materials in a work, uneven line thickness will appear in the painting. The color contrast of these two materials can also lead to the problem of inconsistent colors in children's paintings. Instruct children to use the characteristics of different painting materials to create paintings with different painting

styles. At the same time, cultivating children's ability to use different types of painting materials is the primary task of children's painting education. Other studies have pointed out that children who have undergone long-term fixed drawing exercises have poor control over drawing materials (Blazar and Kraft 2017). Fine arts teachers use a single teaching method to cause children to form a fixed drawing mode. When children learn to use different painting materials, they will also learn some new painting techniques. The expressive ability of children's painting creation will also increase. If the children try to use only fixed painting materials to create painting works, then the style and form of the paintings are also single. Children's ability to create and express their paintings will also decrease.

5.3. Methods

5.3.1. Content for the Test

The content of this part of the study is about the analysis of questionnaires (Appendix C, Questionnaire 3) and case analysis of children's paintings. This part takes primary school students as the research object and analyzes children's painting works to study children's painting creation learning behavior and children's painting material usage behavior. This part of the questionnaire survey is designed based on the knowledge of painting creation, painting techniques and the main points of painting creation. The questionnaire survey is mainly to test the children's use of painting materials and the cognitive status of painting materials in painting practice. At the same time, the research data analyzes the differences in the use and cognition of painting materials by children of different genders and ages. There are two types of questions in the questionnaire. The first category is to test children's ability to use painting materials, the flexibility of using painting materials, the acceptance of new painting materials and the impact of other art works on children's use of painting materials. Another type of question was used to investigate the use of painting materials by children aged 7-13.

5.3.2. Participants

667 children aged 7-13 years participated in the questionnaire survey. The details of the age distribution and gender distribution of the children participating in the test are shown in Table 15. The children participating in the study are all those who have received professional painting training. And these children have the ability to independently create paintings. Studying the painting works of children with independent creative ability is the prerequisite for studying painting materials and painting creation. Children's paintings are formed based on children's personal painting habits. By analyzing children's drawing habits can also help researchers find out the drawing skills that children do not master in the process of drawing. Because this article studies the connection between painting materials and children's painting creation, this test also counts children's use of different painting materials.

Table 15. Gender and Age Distribution.

	Gender		**Age**			**Total Number of Children**
	girls	**boys**	**7 < age ≤ 9**	**9 < age ≤ 11**	**11 < age ≤ 13**	
N	325	342	214	224	229	667

Note. This table shows the gender and distribution of children participating in the test.

5.3.3. Requirements for the Painting Cases

The painting cases used in this part of the analysis are about children's unsuccessful use of painting materials and the successful use of painting materials. Children aged eleven to thirteen are the age stage with the most experience using different painting materials. So the age of the creators of the paintings selected for comparative analysis is between eleven and thirteen years old. The painting materials used in the painting cases selected for comparison are divided into two types. The first type is the paintings using colored pens and colored pencils (Figure 27, 28, and 30). The other type of works are paintings created using collage materials and colored pens (Figure 29 and 31).

5.3.4. Results

Children of different genders showed significant differences in attitudes about using different painting materials to change the color and shape of objects (Chi = 32.486, *P* = 0.000) (Table 16). Boys and girls choose the percentage value of 'agree' (47.07% for boys and 48.00% for girls) is greater than the value of 'disagree'(38.60% for boys and 34.46% for girls). This shows that most boys and girls have a positive attitude towards using different painting materials to change the color and shape of objects. So most children would like to use different painting materials to change the color and shape of objects in paintings.

Table 16. Different Gender Children in Using Different Painting Materials to Change Color and Shape of Objects (Question 1)

	Gender (%)		**Pearson Chi-Square**	***p***
	boy	**girl**		
disagree	38.60	34.46		
moderate	14.33	17.54	32.486	0.000
agree	47.07	48.00		

Note. This table shows the attitude about children of different genders in using different painting materials to change color and shape of objects.

Children of different genders showed significant differences in attitudes toward using different painting materials on the reproducing other people' s paintings (Chi = 17.309, *P* = 0.008 <0.01) (Table 17). Boys and girls choose the percentage value of 'agree' (47.08% for boys and 49.84% for girls) on the question of using different painting materials on the reproducing other people's paintings greater than the value of 'disagree'(The boy's test result is 42.1 %. The girl's test result is 37.23%). This shows that most boys and girls have a positive attitude towards using different painting materials on the reproducing other people's paintings. So most children are willing to use different painting materials to reproduce other people's paintings. At the same time,

girls prefer to use different painting materials on the reproducing other people's paintings (Girls' test results 49.84 are greater than boys' test results 47.08%).

Table 17. Results of Children on Reproducing Other People's Paintings (Question 4)

	Gender (%)		Pearson Chi-Square	*p*
	boy	**girl**		
disagree	42.1	37.23		
moderate	10.82	12.92	17.309	0.008
agree	47.08	49.84		

Note. This table shows the results of children of different genders using different painting materials on the reproducing other people's paintings.

There are significant differences in the attitudes of children of different ages to create paintings using different painting materials (Chi = 30.88, $P = 0.00 < 0.01$) (Table 18). The statistical results of attitudes from the three age stages (50.93%, 47.33% and 44.54%) prove that all children are willing to use different painting materials to create paintings. Also, comparing the test results of three age stages shows that children aged 7-9 years have the highest use of different painting materials.

Table 18. Attitudes about Children Using Painting Materials (Question 2)

	Age (%)			Pearson Chi-Square	*p*
	7 < age ≤ 9	**9 < age ≤ 11**	**11 < age ≤ 13**		
disagree	36.91	31.69	41.05		
moderate	12.16	20.98	14.41	30.878	0.002
agree	50.93	47.33	44.54		

Note. This table shows the result of the attitudes that children using different painting materials to create different types of painting works.

There have significant differences in the flexibility of children of different ages in using painting materials (Chi = 40.15, $P = 0.00 < 0.01$) (Table 19). According to the statistical results of the three age stages, all children' s positive attitudes (50.94%, 49.55% and 57.64%) to the use of various painting materials are higher than negative attitudes (37.85%, 29.91% and 34.5%). At the same time, by comparing the positive attitudes of the three age stages, children aged 11-13 are most flexible in using painting materials.

Table 19. Flexibility of Different Ages Children Using Painting Materials (Question 6)

	Age (%)			Pearson Chi-Square	*p*
	7 < age ≤ 9	**9 < age ≤ 11**	**11 < age ≤ 13**		
agree	50.94	49.55	57.64		
moderately	11.21	20.54	7.86	40.153	0.000
disagree	37.85	29.91	34.5		

Note. This table shows the flexibility of different age children to use painting materials.

Children of different ages have different attitudes about trying new painting materials (F = 9.69, $P = 0.00$) (Table 20). And by comparing the statistical results of the three age stages, it can be proved that children 9-11 years old like to try new painting materials the most.

Table 20. Results of Different Ages Children Changing Painting Materials

Variables	**Age** (Mean ± Standard Deviation)			**F**	***p***
	7 < age ≤ 9	**9 < age ≤ 11**	**11 < age ≤ 13**		
Attitudes about Trying New Painting Materials (Question 3)	4.44 ± 2.17	5.29 ± 2.02	4.56 ± 2.40	9.688	0.000 *
Ability to Change Painting Materials According to the Texture of Objects (Question 5)	4.22 ± 2.17	4.75 ± 2.05	4.20 ± 2.20	4.851	0.008 *

Notes: a.* $p < 0.01$.

b. This table shows the result of children of different ages to change painting. materials according to the texture of objects.

There are significant differences in the ability of children of different ages to change painting materials according to the texture of objects (F = 4.85, $p = 0.008$). By comparing the statistical results of three age stages, it can prove that children aged 9-11 years old are most willing to change painting materials according to the texture of objects. The correlations analysis between the influence of various forms of artwork on

children's use of painting materials and the influence of fine arts teachers on children's use of painting materials shows, there has been a significant positive correlation between two test items (Sig. 2-tailed = 0.000 <0.01) (Table 21). According to the statistical results of children's use of painting materials, the three most common painting materials used by children in drawing practice are color pen 37%, color pencils 30% and crayon 13% (Table 22). The painting materials that children rarely used are acrylic pigment 1% and gouache pigment 2%. So it can be proved that children have few opportunities to contact a variety of painting materials in painting practice. It can also prove that children's ability to control different painting materials is poor.

Table 21. Results of Correlations Analysis

		Influence of Various Forms of Artwork on Children's Use of Painting Materials (Question 7)	**Influence of Fine Arts Teachers on Children's Use of Painting Materials** (Question 8)
Influence of Various Forms of Artwork on Children's Use of Painting Materials (Question 7)	Pearson Correlation	1	0.556 **
	Sig. (2-tailed)		0.000
	N	667	667
Influence of Fine Arts Teachers on Children's Use of Painting Materials (Question 8)	Pearson Correlation	0.556 **	1
	Sig. (2-tailed)	0.000	
	N	667	667

Notes: a. ** Correlation is significant at the 0.01 level (2-tailed).

b. This table shows the correlations analysis between the influence of various forms of artwork on children's use of painting materials and the influence of fine-arts teachers on children's use of painting materials.

Table 22. Statistics on the Usage of Painting Tools and Painting Media Materials.

	Item	**Percentage (%)**
Painting Tools (Question 9)	color pen	37
	color pencil	30
	crayon	13
	pencil	8
	oil pastel	6
	acrylic pigment	1
	gouache pigment	2

	watercolor material	3
Painting Media Materials (Question 10)	sketch paper	45
	card paper	8
	Chinese painting paper	32
	watercolor paper	15

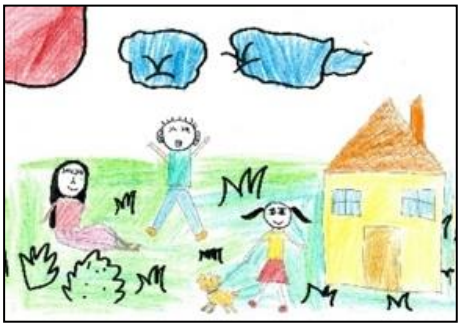
Note. This table shows the statistics on the usage of painting tools and painting media materials.

5.3.5. Analysis of the Use of Painting Materials in Children's Paintings

Children's painting creation training is mainly divided into two parts. One part is children's basic ability training in painting. For example, develop children's color application ability, composition ability, application ability of drawing materials, line control ability and modeling ability. The other part is the training of children's creative thinking. This part is mainly to cultivate children's aesthetic ability. Painting ability training is the foundation of painting creation. Children's mastering of basic painting techniques is the premise of painting creation. At the same time, the application training of painting materials is one of the contents of painting ability training. The research on children's application of painting materials in this study belongs to the scope of research on the training of basic painting skills. Therefore, the evaluation standards related to children's paintings involved in the research are all based on evaluating their basic painting skills. When evaluating children's paintings, it is necessary to observe whether children meet the following standards (Trautner, H. M., 2008 & Malchiodi, C. A., 1998). First, observe whether the objects in the children's paintings match the actual proportions of the objects in real life. For example, some children will make people in paintings account for a larger proportion in the works than houses in the works. In this case, the proportion of objects belonging to the painting is uneven. Second, observe the different tones of colors in children's paintings. Third, observe whether the materials used by the children match the content with the painting. For instance, children use both color pen and color pencil in one painting work, the line thickness will be uneven. This part of the research is conducted through case analysis. The analysis samples used in

the case analysis were selected from the children's paintings participated in the test (Figure 27-31). By studying the exercises of children participating in the test, it can be found that most children have poor control over painting materials. Figure 27, Figure 28 and Figure 29 are examples of unsuccessful use of painting materials. In Figure 27, two painting materials, color pen and color pencil, are used. The creator of this work ignores the characteristics of the two materials. The lines drawn with color pen are thick and the color rendering of this material is higher and the color rendering of color pencil is lower. So in Figure 27, if a black color pen is used as the edge line of the object, the color balance of the entire painting will be destroyed. On the contrary, Figure 30 is a well case of using different painting materials. The edge line of the object with dark color pencil the black line colored by color pen does not break the color balance of the work. And the black object edge line plays the role in emphasizing the content of the painting. Figure 28 is the work tries to use the color spray method to color the background. However, the creator's ability to control the painting tools is weak, resulting in an unsatisfactory background effect. Figure 29 and Figure 31 are two examples of mosaic paintings. The creator of Figure 29 ignores the proportion of objects in the process of collage objects. The structure of the painting is loose due to the small objects in the picture. In contrast, the creator of Figure 31 takes into account the proportion of objects in the painting. Therefore, the visual effect of Figure 31 is better than that of Figure 29.

Figure 27. Painting with Different Materials (Unsuccessful Case)



Note. This is an unsuccessful case of using different painting materials.

Figure 28. Painting with Different Materials (Unsuccessful Case)

Note. This is an unsuccessful case of using different painting materials.

Figure 29. Painting with Different Materials (Unsuccessful Case)

Note. This is an unsuccessful case of using mosaic painting materials.

Figure 30. Painting with Different Materials (Successful Case)

Note. This is a well case of using different painting materials.

Figure 31. Painting with Different Materials (Successful Case)

Note. This is a successful case of using mosaic painting materials.

5.4. Discussion

This part of the study tested the influences of painting materials on children's painting creation. Comparing the test results of children's attitudes towards trying to use different painting materials and the actual use of painting materials in children's practical works shows that children's application of painting materials under the expected and actual operating conditions is inconsistent. Children's attitude test in using different painting materials shows most children are willing to use different painting materials to create paintings. However, the analysis results of the use of painting materials in children's practical works show the types of painting materials that appeared in children's paintings are only about one or two types. This is due to children have limited control ability in using different painting materials. Moreover, children are accustomed to using their familiar materials to create paintings. Some materials such as acrylic, gouache, and watercolor materials are difficult for children to use. The level of children’s painting skills does not meet the minimum standards for the application of these materials. This also shows that there do not have enough courses for children on learning material techniques knowledge and training in applying material techniques in primary school fine arts courses. Therefore, some related courses on training children's painting materials techniques should be set in primary school fine arts courses. In the case analysis of children's paintings, it is shown that poorly correlated between different painting materials in children's paintings. This also shows that children's ability to analyze the brightness, purity, and texture characteristics of painting materials is weak. Therefore, before children use painting materials, fine arts teachers should lead children to be familiar with the characteristics and functions of different painting materials. Through this teaching process, it can also help children create paintings with well visual effects while preventing children from using painting materials by incorrectly flow or usage.

5.5. Conclusions and Suggestions

According to the results of the children's questionnaire test, it can be proved that 7-13 children have a positive attitude towards trying different types of painting materials. However, the analysis results of the children's paintings show that children lack the ability to apply different types of painting materials. The reason for this result is the difficulty of using painting materials. In terms of the difficulty of using painting materials, the use of colored pens, colored pencils, and oil pastels is less difficult. These materials do not require pretreatment before using. The use of these materials is simple for children. Therefore, these materials are used frequently. Because painting materials such as gouache, watercolor, and acrylic need to be mixed with water or different colors before using. At the same time, these kinds of painting materials have certain requirements for users' painting ability. For example, before using these types of materials, children need to understand the concepts of complementary color, cold and warm color, and contrasted color. Children also need to learn to control the changes in lightness and purity of colors. Therefore, it is more difficult for children to apply these types of materials in children's paintings. Without the guidance of teachers, children are prone to misapply these painting materials. The wrong method of using paint can also affect the visual effect of children's paintings. Most children use only one or two painting materials in their paintings. In a few works that use more than two painting materials, the matching between different painting materials is poor. Also, when different materials co-exist in a painting, children's paintings will show that the overall color of the painting is not uniform, the position of the objects in the painting is unreasonable, and the perspective relationship of the painting is not uniform. For example, there will appear two viewing angles (main view and top view) in a painting work. When children use more than two painting materials to create paintings, they will ignore the proportion of objects in the paintings. Therefore, when instructing these children's painting creations, children should be encouraged to use a variety of painting

materials to draw. Also, teachers should pay attention to train children's ability to control the proportion of objects. The reason for causing children’s painting technique problems is that children are not familiar enough with various painting materials. Fine arts teachers should add more painting technique training and painting materials adaptation training in fine arts courses. In the process of painting guidance toning training of watercolor, gouache and acrylic materials also should be added in fine arts courses. At the same time, add the painting materials experience course in fine arts teaching. Let children learn how to use and match different painting materials in the process of applying painting materials. This teaching method will help children better understand the characteristics of each painting material. In addition, in the selection of painting materials, fine arts teachers should guide children to expand the use range of painting materials. For example, sand, food, gift wrapping paper, plastic bottles can be selected as painting materials. Using different kinds of painting materials can also help children improve their creative ability.

Chapter 6: The tests about children’s painting ability

6.1. Introduction

Children's painting ability is the foundation of children's painting creation. The cultivation of children's painting ability is the main task of school fine arts education. Children learn fine arts skills (such as composition methods, coloring rules, painting modeling methods) and painting expression methods (such as watercolor painting, pencil drawing, crayon drawing, etc.) through the learning of fine arts courses (Wang, D. G., 2014). The process of school fine arts education is also the process of training children's visual perception ability. Children learn the ability to analyze the shape and characteristics of objects by observing the shapes, colors, and materials of different objects. At the same time, through the school fine arts course education to build children’s awareness of painting creation. Children's consciousness of painting creation includes controlling the variability of lines in paintings, the proportion of objects and the association of different objects. Through different painting training content, children establish color cognition, spatial cognition and perception ability of objects' shape features. For example, children can understand the concepts of brightness, purity, and saturation of different colors through color matching training. When children observe objects at different visual angles, they experience the creation of paintings from different perspectives (main view, top view, bottom view and side view). And children learn the concept of symmetry, parallelism, and intersection to establish the spatial relationship of different objects in paintings. These skills belong to the basic skills of painting creation and are necessary conditions to cultivate children's creativity in painting. Therefore, the existing training direction of children's painting creativity is mainly divided into two parts. One part is about the training of children's painting creation ability and the other part is about the training of children's painting creation thinking. The training of children's painting creation ability is about painting skills

training. The training of children's painting creative thinking is the training on the content arrangement of children's paintings.

The goal of children's painting ability training is to help children improve their expressive ability through the training of painting techniques. The training of children through painting techniques mainly includes painting composition training, color application ability training, line control ability training and the description ability of the object in painting works. Before children are trained in painting techniques, children need to understand the basic visual characteristics of each object in the painting (Cox, M., 2005). Basic visual characteristics refer to the shape, proportion, texture and color of objects. Learning the method of acquiring the characteristic information of objects is also the basis of children's painting creation. The method for children to acquire basic visual features is through observation training achieved (for example, teachers guide children to analyze and summarize the shape characteristics of different objects, guide children to compare and analyze the difference between the actual proportion of objects and the proportion of objects in paintings, and analyze the artistic characteristics of artistic works). For some children who cannot complete the painting creation task independently, these children are unable to complete the painting creation task due to the limitation of painting ability (application ability of painting technique, modeling ability). Effective painting technique training and observation method training in school fine arts education can cultivate their ability to complete painting creation independently, because training in painting techniques can provide children with painting methods. Observation training can provide children with the direction of painting creation and the content of paintings. At the same time, children master the methods and abilities of painting creation under the guidance of school fine arts teachers. Therefore, the method for children to obtain painting creation mainly depends on the fine arts knowledge provided by the fine arts teachers to the children in the learning fine arts courses and the training methods designed by the fine arts teachers.

The purpose of training children's creative thinking in painting is mainly to help children expand their imagination. Imaginative images created by children are composed of three forms of images: the image obtained by children from their visual experience (the content of the image is derived from real life), and the original image of children (such images are not existing in real life) and children ’s transformed images (these images are children ’s partial changes to the shape and features of their observed objects) (Dziedziewicz, D., et al., 2015). Therefore, the development of children's imagination is connected with children's visual experience. Children's painting creativity training can be achieved through children's understanding and analysis of image information (image information refers to what children see in life or the content of images obtained by children in fine arts courses). After the children fully understand the content of the image information, they can modify part of the content in the image and convert the modified image information into a painting (Jolley, R. P., et al., 2013). In this process, fine arts teachers instruct children to create paintings by changing part of the image information they see. Among them, the specific training directions of children are divided into three categories: changing the external decorative patterns of objects, changing the shape characteristics of objects, or changing the existence space of objects (combining objects that exist in different scene environments in one painting). This type of training method is to promote the development of children's painting imagination by changing children's visual cognition. At the same time, under the influence of this training method, the styles of paintings created by children belong to decorative styles and abstract styles.

The process of forming children's imagination is obtained through participation and artistic experience activities that rely on children's perception ability (KornBursztyn, C., 2012). In art experience activities, children can help children observe the form of works of art, think about the creative process of works of art, and feel the aesthetic characteristics of works of art. School art courses are also one way to

help children experience art activities. Children develop their imagination in drawing through drawing creation exercises and observation training while participating in the school's art curriculum. In school art education, children's drawing imagination training is achieved through three training methods: scene association training, object association training and abstract painting creation training. The training direction of scene association training is that the teacher asks the children to associate around the preset theme by setting the theme. During the training process, the art teacher will first set an imaginary theme, and then let the children associate the life scene, school scene or event scene related to this theme. This training method can help children think about the theme, content and scope of the painting. The specific training content of item association training is to use items as the theme of children's imagination. Children surround the preset items and associate the existence of the items and the things related to the preset items. This training method can help children clarify the relevance of different objects in paintings. The training content of abstract painting creation training is for teachers to help children get rid of a single painting mode by instructing children to change the shape and characteristics of objects in paintings, because after children master the creation methods of different objects and characters, their modeling mode will be stable. And children's painting creation is based on the original appearance characteristics of objects in nature. Children's paintings will have the problem of similar appearance characteristics of the same object in different works. Therefore, the training of abstract painting creation can help children change the mode of painting creation. At the same time in the process of training children can enhance their imagination of painting.

6.2. Background

The composition form of painting works is related to the visual effects of painting works. There are primary and secondary factors of visual aspect in a painting. The main

factors in paintings refer to objects or characters related to the content of the theme in paintings. It is also the first part that people will pay attention to in the process of appreciating paintings. The secondary factors in paintings refer to objects that play a decorative role in the works (such as decorative patterns, plants, sky, clouds, etc. in the paintings). These secondary factors also show the hue, scene characteristics, and characteristics of the natural environment of the painting. Therefore, the arrangement of the main and secondary factors in the painting determines the visual content of the painting. And the positional relationship and spatial distribution between the two also determine the visual effect of the painting. The composition of paintings determines the order and spatial relationship of objects in paintings (Arnheim, R., 1983). In children's paintings, the distribution of different objects will make their paintings show different visual effects. The composition methods of children's paintings are arranged composition, central composition and decentralized composition. For paintings with a central composition, the visual focus of such works is in the center of the painting. The purpose of such works is to highlight the main content of the painting. The central composition is mostly used for children's creative portraits. The characteristic of children's paintings in the arrangement composition is that all objects in the paintings are evenly distributed in the picture (Cathy A. M., 1998). Due to the lack of contrast between the objects in this type of painting works (such as distance contrast, proportion contrast), there is a problem of unclear painting themes in such works. For paintings with decentralized composition, the positional relationship between different objects in such works is not clear (Golomb, C., 2003). In such works, the theme of painting may be unclear. Therefore, painting composition training has a positive influence on the visual effects of children's paintings.

Children's ability to recognize the appearance of objects is related to children's modeling ability. The shape characteristics of the objects in the paintings are a combination of lines, colors, textures, spatial relationships (perspective) (Bouleau, C.,

2014). For painting learners, their drawing modeling ability is the foundation of painting creation. Therefore, when children have established the ability to recognize the shape characteristics of different objects, they can express the shape characteristics of objects through lines, colors, textures, and spatial relationships. At the same time, children's ability to recognize objects determines the level of children's painting ability. The shape characteristics of an object are determined by the height, length, width, dynamics, and presence environment of the object (such as the environment in which plants grow and the environment in which objects exist). When children create paintings, focusing on depicting the most representative external features of objects can help children express the appearance of objects in paintings. Therefore, when training children's ability to observe objects, fine arts teachers need to guide children to summarize the most representative characteristics of different objects (such as object height, length, width, dynamics, presence environment). Instructing children to observe the structural characteristics of unused objects also helps to improve children's modeling abilities. For example, when an fine arts teacher guides a child to observe the appearance of a plant, the teacher needs to introduce to the child the external structural characteristics of the plant (such as the roots, stems, and leaves of the plant), the internal structural characteristics of the plant (such as the location, size, and shape of the leaves growth morphology), growth environment. This kind of guidance can provide children with a way to observe the detailed characteristics of objects. This method can also help children improve their painting modeling ability.

There are story contents in the scene painting works (the scene painting will contain the cause, process and result of the event). The painter expresses the development process of the events involved in the painting through the costumes, expressions, dynamics, gestures and positions of the characters in the painting. Scene painting observation and creative training help to develop children's thinking ability and ability to understand causality (Malchiodi, C. A., 1998). With regard to the selection

of children's training content, comic strip works are suitable for children's observation training. Because there is also story content in comic strips that are also created according to the sequence of events, fine arts teachers can use some comic book sorting training (sort pictures of comic book works according to the development order of events) to help children build thinking ability and understand the ability of causality in the school fine arts education. Include structured tasks (such as prediction tasks, sequential tasks, and observation tasks) in children's painting creation activities (Malchiodi, C. A., 1998 & Silver, R., 2010). For example, the experiment designed by Silver shows the process of filling a glass from a full glass with no water in it by drawing lines on some empty glass cups (Silver, R., 2010). The purpose of this test is to test children's predictive ability and sorting ability. Testing of children's space concept Willats (1977) and Silver (1996) designed painting tasks for children. They let children draw four objects (including three cylinders of different heights and widths and a small stone) on paper. This test is to determine the child's grasp of the concept of space by analyzing the positional relationship of four objects in children's paintings (Willats, 1977 & Silver, 1996). Therefore, children's spatial cognitive ability can be analyzed according to the positional relationship of different objects in children's paintings.

Children's observation ability affects the content of children's paintings. Children are used to recording what they observe in paintings. Therefore, children's observation methods will affect the shape characteristics (for example, the height, width and proportion of objects) and spatial characteristics (for example, the perspective relationship and positional relationship of different objects) of objects in paintings. Observation training can also lead children to pay more attention to the details of the objects (such as the decorative pattern of the object, the outline of the object, and the environment in which the object exists) when creating the painting. Observation training also has a positive effect on children's creative thinking in painting. For example, when a child observes a painting, the child learns how to apply the color of

the painting, how to organize the shape of objects in the painting, and how to compose the painting. And when children create paintings, children will apply the learned painting methods to painting creation. Therefore, observation training can cultivate children's creative thinking in painting. Children's painting observation training will also affect children's thinking ability. In the process of children's observation training, children will experience the development or growth of different things. When the child observes the appearance characteristics of the animal, the child can understand the growth environment of the animal and the appearance characteristics of the animal during the observation. Through this observation process, it can help children to better complete the detailed description of the objects in the paintings. Therefore, observation training has a positive influence on children's painting creation.

6.3. Methods

6.3.1. Content for the Test

This study tested children's painting abilities from five aspects the test contents are composition recognition ability test (Question 1and 2), content recognition ability test (Question 3), object assembly test (Question 4 and 5), painting skills test (Question 6, 7 and 8), and comparative observation ability test (Question 9) (Appendix D, Questionnaire 4).

The aim of questions 1 and 2 is to test children's spatial cognitive ability and composition ability. Children need to choose one figure from the five options. The requirement of the answer is that the arrangement of objects in the option figure should has same arrangement regular in Figure X. The scoring method of the five options in question 1 are: 1 point for the 'a' option (In the picture of this option, there is only one objects' arrangement rule is the same as Figure X, so it is counted as 1 point), the 'b' option counted as 2 points (there are two objects' arrangement rules is the same as Figure X, so it is counted as 2 points), and the 'c' option counted as 3 points (there are

three objects in the arrangement rules consistent with Figure X, so it is counted as 3 points), the 'd' option is counted as 4 points (in the picture of this option, the arrangement of the positions of four objects is the same as Figure X, so it is counted as 4 points), the 'e' option is counted as 5 points (in the picture of this option, all objects are arranged in the same way as Figure X, so it is counted as 5 points). Question 2 tests children's composition ability. The requirement of Question 2 is for children to choose one image from the five image options that is the most similar to the composition of Figure Y. The counting method of question 2 is same as question 1.

The third question is the image sorting test. This question tests children's ability to understand the content of paintings. The detail counting method of the third question is that the order of the five pictures is all errors is counted as 0 points, one picture is arranged correctly is counted as 1 point, two pictures are arranged correctly is counted as 2 points, three pictures are arranged in the correct sequence is counted as 3 points, four pictures are arranged correctly is counted as 4 points, five pictures are arranged correctly is counted as 5 points.

The fourth and fifth questions test children's cognitive ability of the structure of objects. The scoring method of these two questions is to calculate the score according to the correct rate of the order in which the children arrange the pictures (the scoring range is from 0 point to 6 points). Figure 32 and Figure 33 show the answers of the fourth and fifth question.

The sixth, the seventh and the eighth question are about children's painting skills test. These three questions are test children's understanding of perspective knowledge and children's observation ability. Before answering these three questions, children need to judge the type of the views and perspectives of the image. At the same time they need to mark the line of water level and perspective lines in the images of the three questions. Figure 34 shows an example of marking the line of water level and perspective lines on the surface of the glass. The total score of the sixth question is 6

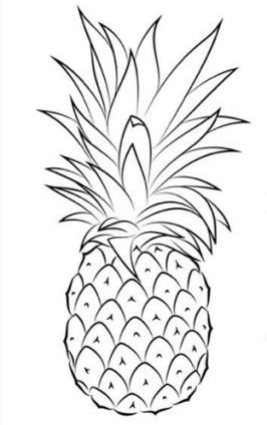
points (including 2 points for correctly marked the water level line, 2 points for the line indicating the poured water, and 2 points for correctly marked the water level line and perspective line on the surface of the glass) (Figure 35). The image in Question 7 shows the plan view of the glass. Therefore, children only need to mark the water level line on the surface of the glass. The total score of this question is 6 points (including 3 points for correctly marked water level lines, and 3 points for correctly showing the perspective relationship of the water level lines) (Figure 36 and 37). The picture in the eighth question shows a perspective view of glass. So children need to mark the perspective line and water level line on the surface of the glass. The total score for this question is 6 points (including 3 points for correctly marked water level and 3 points for correctly marked perspective line) (Figure 38 and 39).

The ninth question tests children's observation ability. The purpose of this question is to test children's ability to observe the details of objects in paintings. There are five different places in the picture of the question. Children can get 1 point for each difference. The total score of this question is five points.

Figure 32. Example Answer of Question 4

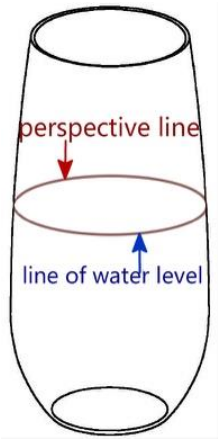
Note. This image shows the answer of Question 4 (6 points).

Figure 33. Example Answer of Question 5



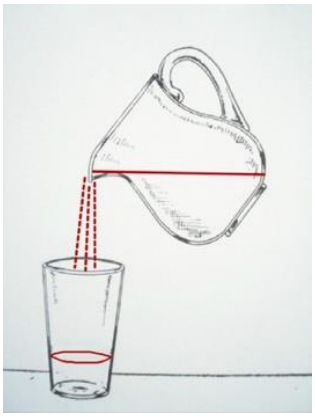
Note. This image shows the answer of Question 5 (6 points).

Figure 34. Rules for Scoring



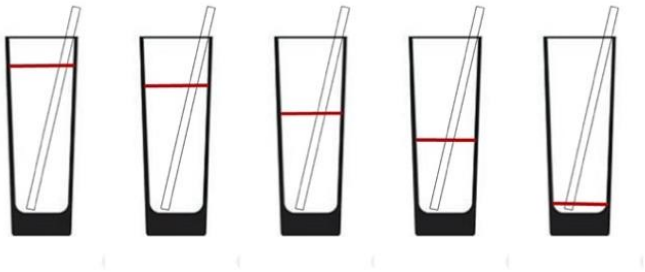
Note. This image shows the water level line and perspective line on the surface of the glass.

Figure 35. Example Answer of Question 6



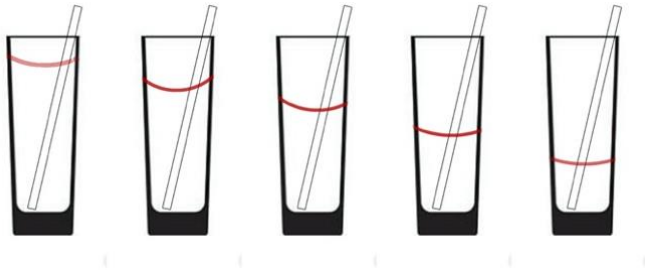
Note. This image shows an example answer of Question 6 (6 points).

Figure 36. Example Answer of Question 7



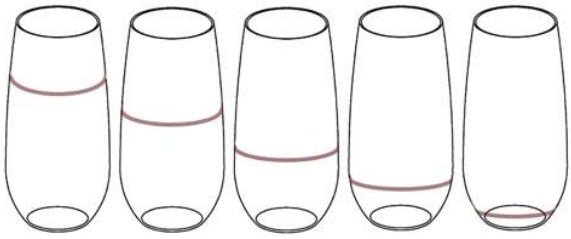
Note. This image shows an example answer of Question 7 (6 points).

Figure 37. Example Answer of Question 7



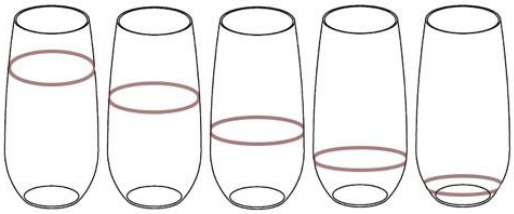
Note. This image shows an example answer of Question 7 (3 points).

Figure 38. Example Answer of Question 8



Note. This image shows an example answer of Question 8 (3 points).

Figure 39. Example answer of Question 8



Note. This image shows an example answer of Question 8 (6 points).

6.3.2. Participants

A total of 1360 children participated in this part of the test (Table 23). There are 610 girls and 750 boys. All children participating in the test are between 7 and 13 years old (503 children between 7-9 years old, 651 between 9-11 years old, and 206 between 11-13 years old).

Table 23. Gender and Age Distribution

	Gender		**Age**			Total Number
	girl	**boy**	**7 < age ≤ 9**	**9 < age ≤ 11**	**11 < age ≤ 13**	of Children
N	610	750	503	651	206	1360

Note. This table shows the gender and age distribution of children participating in the test.

6.3.3. Results

This study analyzes the drawing ability of children of different ages and genders through the results of the correct rate of each question in the statistical questionnaire (Table 24). The test results of all test items show that there is no obvious difference between boys and girls in the recognition of different painting abilities (include composition recognition ability, content recognition ability, object assembly ability, painting skills, comparative observation ability). From the children's spatial cognitive ability test results (Question 1) (Accuracy Percent = 51.5%), it can be proved that more than half of the children have well ability to analyze the positional relationship of different objects in the image. This also shows that more than half of children have a better ability to observe the positional relationship of objects. According to the test results of children of different ages (Accuracy Percent = 34.4%, 59.8 and 67%), children ’s spatial cognitive ability will increase as children grow up.

In the children's compositional cognitive ability test, more than half of the children's compositional cognitive ability is poor (Question 2). According to the test results of children (Accuracy Percent = 45.5%), it is proved that children have poor

judgment ability on the composition style of paintings. It can also prove that children's ability to analyze the composition of paintings is poor.

In the Image Sorting Ability test (Question 3), 46.6% of the children completed the sorting task. This sorting task is to test children's ability to analyze the content of paintings. So it can be proved that most children lack the ability to analyze the content of paintings. This also shows that children's ability to understand the story content of the scene painting (the scene painting will contain the cause, process and result of the event) is weak.

The fourth and fifth questions in the questionnaire test children's cognitive ability of object structure. The test results (Accuracy Percent = 12.8% and 8.9%) indicate that children have a lower level of understanding of the structure characteristics of objects. It also shows that children's ability to analyze the shape characteristics of objects is weak.

Questions 6, 7 and 8 of the questionnaire test children's ability to judge the type of the views and perspectives of the image. According to the test results, children have a strong cognitive ability for floor plans (Question 7, Accuracy Percent = 92.9%). However, children's cognitive ability to perspective images is weak (Question 6 and 8, Accuracy Percent = 0.1% and 5.8%). Almost all children cannot mark perspective lines on the surface of the glass. This can also prove that children have poor ability to understand perspective knowledge. Children's ability to find details in paintings is weak.

According to the observation ability test (Question 9), it is proved that most children ignore the detailed features of objects (such as the shape features of objects ,and decorative features of objects) or characters (such as facial expression features, and contour lines of characters) when observing objects or characters.

Table 24. Accuracy Statistics

Items	Age and Gender	Frequency	Percent
Spatial Perception	total	700	51.5

(Question 1)	7 < age ≤ 9	173	34.4
	9 < age ≤ 11	389	59.8
	11 < age ≤ 13	138	67
	boys	375	50.0
	girls	325	53.3
Composition Ability (Question 2)	total	619	45.5
	7 < age ≤ 9	258	51.3
	9 < age ≤ 11	293	45.0
	11 < age ≤ 13	68	33
	boys	335	44.7
	girls	284	46.6
Image Sorting Ability (Question 3)	total	634	46.6
	7 < age ≤ 9	229	45.5
	9 < age ≤ 11	313	48.1
	11 < age ≤ 13	92	44.7
	boys	338	45.1
	girls	296	48.5
Structural Cognition 1 (Question 4)	total	174	12.8
	7 < age ≤ 9	76	15.1
	9 < age ≤ 11	78	12.0
	11 < age ≤ 13	20	9.7
	boys	90	12
	girls	84	13.8
Structural Cognition 2 (Question 5)	total	121	8.9
	7 < age ≤ 9	37	7.4
	9 < age ≤ 11	63	9.7
	11 < age ≤ 13	21	10.2
	boys	63	8.4
	girls	58	9.5
Painting Ability 1 (Question 6)	total	1	0.1
	7 < age ≤ 9	0	0
	9 < age ≤ 11	1	0.2

	11 < age ≤ 13	0	0
	boys	0	0
	girls	1	0.2
Painting Ability 2 (Question 7)	total	1264	92.9
	7 < age ≤ 9	473	94.0
	9 < age ≤ 11	602	92.5
	11 < age ≤ 13	189	91.7
	boys	698	93.1
	girls	566	92.8
Painting Ability 3 (Question 8)	total	79	5.8
	7 < age ≤ 9	17	3.4
	9 < age ≤ 11	43	6.6
	11 < age ≤ 13	19	9.2
	boys	41	5.5
	girls	38	6.2
Observation Ability (Question 9)	total	517	38.0
	7 < age ≤ 9	199	39.6
	9 < age ≤ 11	238	36.6
	11 < age ≤ 13	80	38.8
	boys	267	35.6
	girls	250	41.0

6.4. Discussion

This part of the study mainly tested children's painting ability. The study about the analysis of children’s paintings based on children’s cognitive perspectives has verified that the childhood of children has the ability to describe spaces in their paintings (Beverley Lambert, E., 2005). Children's cognitive ability of space starts from the childhood of children. However, the assessment of specific levels of children's spatial cognition is not mentioned. The test results of this part show that nearly half of the

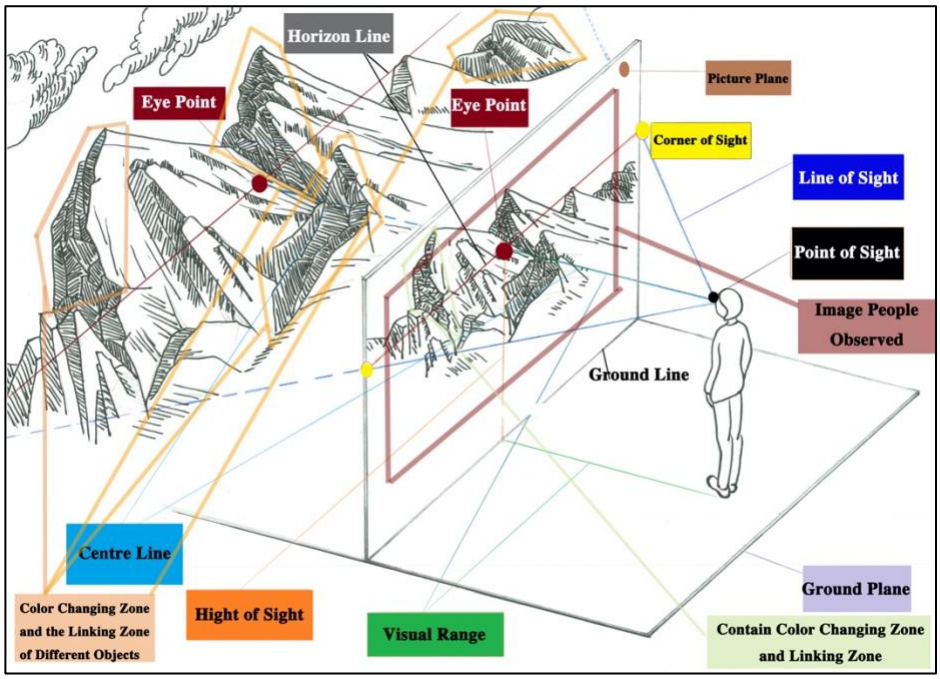
children have a well spatial cognitive ability and spatial description ability. According to the test results, it is found that children's spatial cognitive ability is continuously improved as children grow up. According to the requirements of Chinese primary school art education standards, primary school students in grades three to six need to have the cognition of the structure recognition ability of the objects (Ministry of Education of the People's Republic of China, 2011). However, from the test results of the study, it can be seen that children's cognitive ability of the structure of the object does not meet the requirements. The reason for this result may be that children do not have the method of summarizing the structural features of objects. When some children observing objects, children may ignore the overall shape features of the object, such as the width, height, and outline characteristics of the object. The other reason is children who only pay attention to the detailed features of the object (such as the texture features of the object) will ignore the overall features of the object. This kind of observation habit can also affect the children's summarized ability of the structural features of the object. Moreover, children's ability to summarize the appearance features of objects will affect children to build structural cognition ability. Therefore, children's inability to accurately summarize the overall features of the object will limit the development of children's structural cognitive ability.

It is mentioned that the Chinese primary school art education standards require students in grades five to six need to master basic spatial modeling skills (such as the ability to judge the type of the views and cognitive ability about perspective) (Ministry of Education of the People's Republic of China, 2011). However, judging from the test results, the children's perspective cognitive ability and the ability to judge the type of the views of the image did not meet the requirements. The reason for this result is that children cannot well understand the content of perspective knowledge. In the painting techniques education, perspective knowledge is one of the technical knowledge that children cannot easily understand. Because before children learn perspective

knowledge they need to understand the meaning of the perspective concept. In the process of learning perspective knowledge, children need to remember the content referred to by professional terms such as distance point, line of sight, horizontal line, eye point, visual angle, and ground plane in advance. But base on children's ability to receive knowledge it is difficult for children to understand and remember this kind of knowledge. In addition, the reason why children cannot grasp perspective knowledge is due to their observation habits. The light from different positions and the viewing angle of people will make the object present different perspective relationships (for example, one-point perspective, two-point perspective, three-point perspective, and parallel perspective, etc.) (Gill, R. W., 1975). People judge the internal perspective relationship of an object by combining the changing of color of different components and different observation angles (Figure 40). By contrast, when children observe an object, children will first notice the surface features and contour feature of the object (Figure 41). Therefore, the spatial relationship between different objects in children's paintings is weak. In addition, most of the objects in their works are composed of contour lines and flat colors. Take the children aged from seven to thirteen 's paintings which contained natural scenes as examples, most of the mountains in children's paintings are composed of simple contour lines and flat color blocks (Figure 42). The front and rear positional, the neighboring positional relationship, and the perspective relationship of each mountain in their paintings are not shown. These surface and contour features are composed of two-dimensional space. Base on the children's spatial cognitive ability test in the questionnaire, it can be shown that most children have a poor ability to recognize spatial relationships of objects. It can also explain that it is difficult to improve the spatial cognitive ability of children by only relying on their independent observation. The principle of perspective is related to three-dimensional space. For some children, it is difficult to feel the three-dimensional space directly through the eyes. Therefore, children's observation habits will affect children's

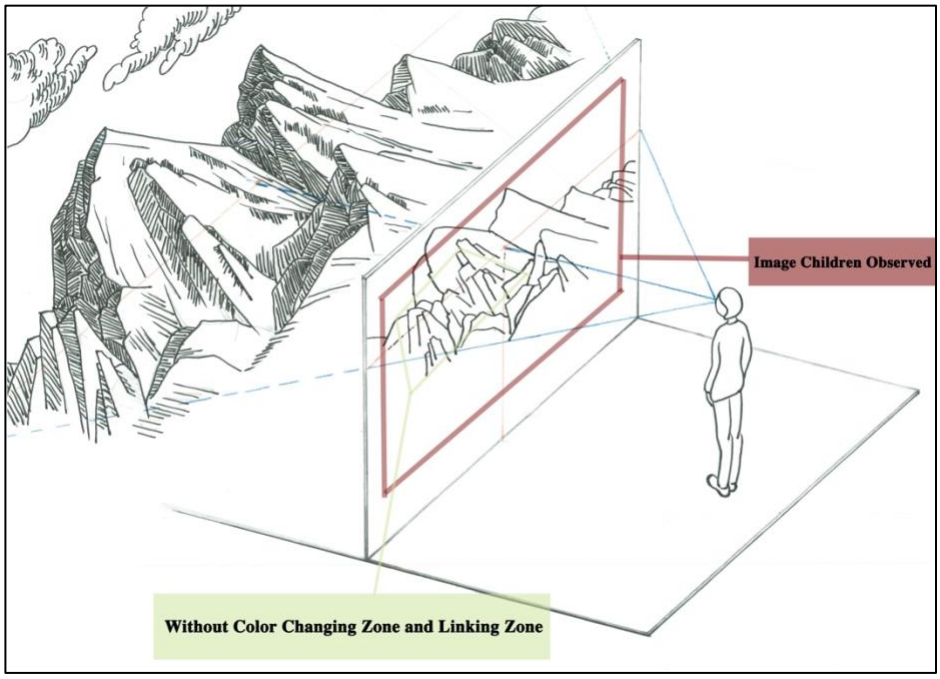
understanding and application of perspective knowledge. Meanwhile, fine arts teachers guide children to learn perspective knowledge and observation method can help children improve their observation ability.

Figure 40. Simulated Image of People Observing Objects



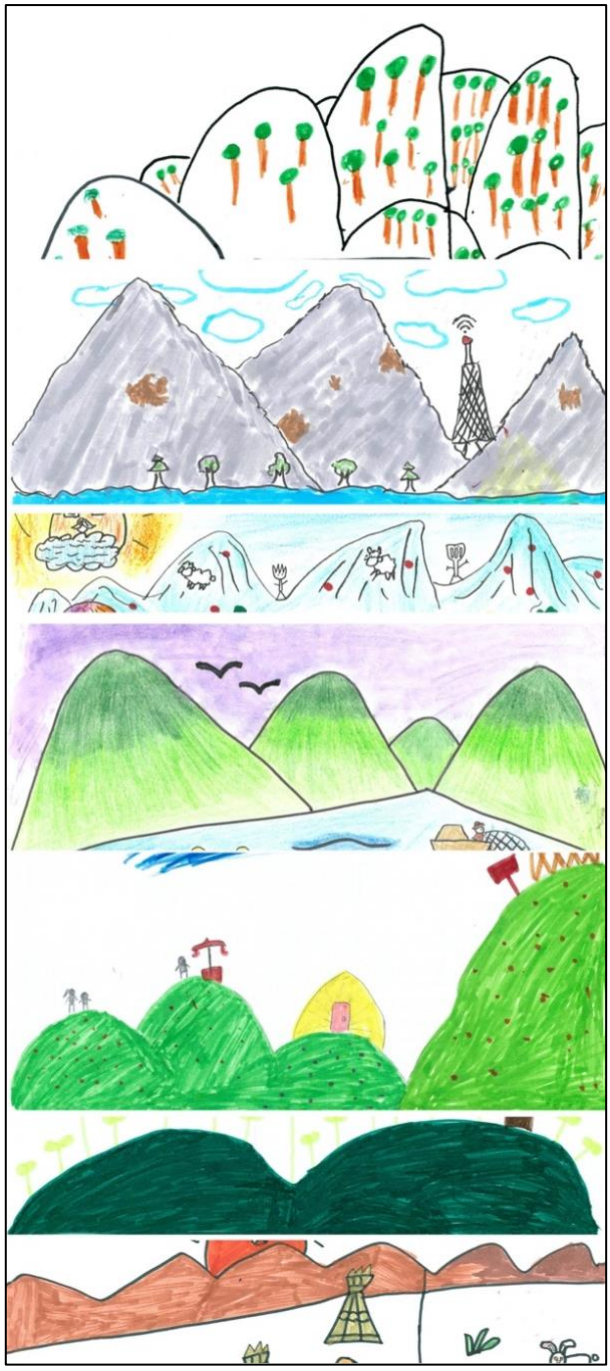
Note. This picture shows the details while people observing objects.

Figure 41. Simulated Image of Children Observing Objects



Note. This picture shows the details while children observing objects.

Figure 42.Image Details Selected from Children's Paintings



Note. This image shows the different types of descriptions of mountains in children's paintings.

6.5. Conclusions and Suggestions

According to the test results, it can be proved that children's cognitive ability of

perspective relationship and understanding of perspective concept are weak. Children will ignore the perspective relationship and visual angle of objects (such as front view, top view, bottom view and side view) when observing objects. Therefore, fine arts teachers need add the content about perspective knowledge in the school fine arts courses. Fine arts teachers also need to guide children build the ability to analyze the perspective relationship between different objects in paintings. In the process of children learning to paint, it is necessary for children to learn the perspective views of different objects. Through this process, it can help children understand the structural characteristics and spatial positions of different objects more clearly. In addition, children will improve their drawing and modeling skills in the process of learning perspective knowledge. In the process of children observing the shape characteristics of objects, children tend to ignore the details of objects (such as the decorative patterns, positions, material features, proportions of objects). This problem will also reduce the visual effects of children's paintings. Therefore, fine arts teachers can provide some observation training for children when guiding children's painting creation to solve this problem. For example, fine arts teachers can provide children with pictures of paintings and then ask children to describe the appearance of different objects in the pictures. In addition, fine arts teachers can also train children's observation skills by comparing the differences between several similar pictures (such as images with similar composition features, characters and objects). According to the test results of children, most children have a weak ability to analyze the content of paintings. So fine arts teachers can arrange analysis courses on paintings in fine arts courses. Fine arts teachers can guide the children to compare the differences of the appearance characteristics of objects in paintings and actual environment. Through this training method, children can understand the different between objects are expressed in paintings and actual environment. At the same time, fine arts teachers can arrange some scene reproduction activities in fine arts courses. For example, instruct children to reproduce scene features

in paintings in real life situations. This kind of activity will leads children to learn the composition principles of painting works and the creative methods of scene painting while restoring the composition rules of painting works.

Chapter 7: Integration of Conclusions and Suggestions

7.1. Guidance of Children’s Painting Creation

7.1.1. Suggestions for Primary School Practical Painting Education

The training of painting techniques and the training of creative thinking are important components of children's fine arts courses. Painting techniques training will provide children the basics of painting abilities. Creative thinking training can cultivate children's imagination. Training of children's painting skills in school fine arts education is a prerequisite for painting creation. Therefore, the training of painting skills is an indispensable part of the fine arts curriculum in primary schools. Fine arts education researcher insists that children's painting courses should be based on children's independent development (Lowenfeld, V., 1987). But this kind of irregular painting creation learning will hinder the development of children's creative consciousness and cognitive ability. In fact, painting skills training will not limit children's creativity and imagination. At the same time, different types of painting training methods can specifically solve the difficulties encountered by children in painting creation. For example, observation training can help children improve their modeling ability. Color matching training can help children improve their color recognition ability. Therefore, the primary school painting education should be based on the training of painting techniques and painting creation ability. Regarding the content arrangement of school fine arts education, according to the results of this study, most children have poor application skills in painting techniques. Also, children lack learning about painting techniques. Fine arts teachers should focus on two aspects of children's painting skills training and painting creativity in the arrangement of painting courses. In the training of children's painting skills, there are problems in children's painting material application ability, object proportion observation ability, contour line control ability. Therefore, when the fine arts teacher directs the children's painting

creation, corresponding training methods should be added. For example, fine arts teachers can cultivate the habit of children designing drafts of paintings. After designing drafts, teachers and children analyze the advantages and disadvantages of these drafts. Children will find out their problems in painting ability through the process of such exercises. The teaching methods of fine arts teachers in school fine arts courses influence the results of children's painting. Children prefer to learn to paint in a free and pleasant classroom atmosphere. Therefore, experiential fine arts teaching and learning fine arts knowledge in games have a positive impact on children's painting learning results. The evaluation of children by fine arts teachers in the process of children's painting creation affects children's learning results. Positive evaluation can build children's confidence in painting learning and keep children always be learning.

7.1.2. Suggestions for Children’s Practical Painting Learning

Children's painting creation training is mainly achieved through color cognitive training, composition cognitive training, modeling training, and composition training. Through these trainings, children can clearly know the methods and direction of painting creation. In the process of painting practice, children need to pay attention to the hue, composition, line, proportion, perspective and details of their paintings (including the decorative patterns of objects in paintings, the expressions of characters, and the dynamics of characters). In most children's paintings, there is a problem of lack of connection between different colors. The level of children's color application ability is limited to reflect the actual color of the object. But as far as painting creation is concerned, the ability of color application requires that there should be different color relationships (such as neighboring colors, contrasting colors, and complementary colors) in the painting. Color matching training is the focus of children's daily painting practice. Children need to experience the correlation between different colors through color matching exercises. For example, learning to use acrylic, watercolors and gouache can

improve children's ability to match colors. Because these materials need to be pre-treated before use (pre-processing refers to users of painting materials need to mix different colors of pigments together, or mix different colors of materials with water). Therefore, children experience the relevance of colors in the process of learning to use these materials. In modeling exercises, children need to pay attention to the proportion of objects in paintings. Children will ignore the height, width and proportion of different objects in paintings during the practice of painting. These problems will also affect the visual effects of children's paintings. Therefore, in the process of children's painting practice, children need to establish the ability of self-assessment (learn to independently fine out the problems in children's own works). Self-assessment can help children discover the details they overlook in painting creation. At the same time, children's painting ability will also be improved in the process of evaluating and modifying paintings. In addition, most children have weak spatial cognitive ability. In children's painting practice, learning the concept of perspective is necessary. Children can also build spatial cognitive abilities by practicing painting perspective views of different objects. For children, the importance of painting practice is to train children's ability of painting creation and application of painting techniques. It is also to cultivate children's ability to independently create paintings.

7.1.3. Suggestions for Children’s After-school Painting Practice

The factors that affect the result of children's after-school painting exercises are the after-school painting exercise tasks arranged by fine arts teachers, parental support and the length of time children use for painting exercises. After-school practice tasks arranged by fine arts teachers determine the direction of children's after-school practice. The process of painting practice after class is also the process of children reviewing painting skills and knowledge. Therefore, fine arts teachers need to add tasks related to reviewing the content of school fine arts courses when arranging after-class painting

practice tasks. For example, the content of children’s fine arts courses in school is about appreciating paintings. Then the task of children’s after-school painting practice can be set to imitate the paintings appreciated in the fine arts class. Such imitation exercises can help children better understand the content of school fine arts courses. Children's painting ability will also be improved in the process of imitating. Children’s after-school painting exercises are mostly done at home. In the process of children's after-school painting practice, parents' attitude towards children's painting practice will also affect children's painting practice results. If parents support children to practice drawing at home, then children will have time to practice painting. Children's painting practice time is directly proportional to children's painting learning results. Therefore, the support of parents can enable children to obtain well learning results in painting. Parental companionship can also help children better complete painting exercises. In the process of children's practice of painting after class, children will encounter the problem of no inspiration for painting creation and application of painting materials. Because the place for children's painting practice is outside the school fine arts class, children cannot obtain guidance from fine arts teachers in a timely manner. Parents’ accompanying children to practice painting can help children solve this problem. Parents can introduce their painting experience and learning experience to children during the children ’s painting practice. When children encounter technical problems in painting, parents can also help children find solutions. Therefore, parents’ accompanying children painting practice has a positive influence. Parents' companionship is important in children's after-school drawing exercises. In addition, the results of painting practice are related to the length of time children spend in practice. Children's ability to apply painting skills is dependent on children's long-term practice. The longer children practice painting after class, the higher their painting ability will be.

7.2. Contribution to Adults Practical Creative Behavior Education

This study illustrates the difficulties and solutions for children in using different types of painting materials. Painting materials are a medium that helps painting learners to show the artistic effects of paintings. Different painting materials represent different art forms. The application training of different painting materials in the stage of children's painting education is also a process to help children accept and understand different painting forms. Therefore, the application training of painting materials can also provide a basis for children to diversify their painting expressions form in their later life.

According to children's painting ability test, it has shown the importance of children's observation ability training and painting professional skill training (spatial perception ability training and composition ability training) to children's practical creative behavior. The test results also show that these professional skills are related to children's observation ability. The improvement of people's observation ability needs to be achieved through long-term training. The development of children's observation habits in the learning process of painting courses directly determines the children's ability to paint. These observation habits also directly affect practical creative behavior into later childhood and adolescence period. Therefore, professional painting skills education is of importance to people’s ability to create paintings from their childhood to adulthood.

7.3. Limitations and Future Work

7.3.1. Limitations

This study tested the impact of school fine arts teachers, children ’s parents, painting materials, and children’s drawing abilities on children ’s painting. In this study, some suggestions related to children's painting creation learning and fine arts teacher

guidance were also involved. However, there are still some limitations on detailed research on some issues.

Firstly, there is study on the influence of fine arts teachers on children's painting learning. This part of the study is to test the influence of fine arts teachers' teaching methods, evaluation, and encouragement on children's painting creation from the perspective of children. And this part of the research is conducted from a global perspective. For example, fine arts teachers' teaching methods, styles, and attitudes are all tested from a global perspective. However, the relevant tests on the impact of the specific teaching content implemented by fine arts teachers in the courses (such as environmental protection theme courses, abstract painting creation courses, and fine arts appreciation courses) on children's painting creation are not involved in this study.

Secondly, regarding the influence of parents on children's painting creation, this part of the research uses parents as the research object to test the influence of parents on children's painting creation. But in this part of the test, there is no test for children's attitude towards parental companionship. For example, a test of children's acceptance of parental companionship, a test of communication between children and parents, and a test of children's acceptance of parental evaluation. These aspects may also affect children's painting creation. Therefore, these contents can also be used as the analysis direction for further study.

Finally, with regard to the painting ability test, this part tests the children's perspective cognitive ability, observation ability, and composition analysis ability. However, the analysis content of the three aspects of the children's modeling ability test, painting details analysis test, and color cognitive ability test are not involved in the thesis. These test contents can help researchers to understand children's drawing ability more comprehensively. So testing and analyzing children's painting ability can be continued from these aspects in the further study.

7.3.2. Future Work

In the analysis of children's paintings, further studies can be analyzed from the details of children's paintings. For example, through the expressions and dynamics of the characters in children's paintings, analyze the impact of different details in the paintings on the visual effects of children's paintings. At the same time, analyze the impact of these detailed characterization on children's creative expression. In addition, the analysis of children's paintings can also be studied through the use of digital image analysis. By extracting the details in children's paintings as the basis for classification and then using different algorithms to judge the quality of children's paintings. In terms of the study of the influence of fine arts teachers and school fine arts courses on children's painting creation, in the future analysis and research of school fine arts teachers' teaching behavior and children's classroom performance. For example, evaluate the impact of school fine arts courses and fine arts teachers on children's painting creation from the aspects of teachers' guidance strategies, the specific content of fine arts courses and children's performance in fine arts classrooms.

Appendix A

Questionnaire 1

The impact test of fine arts teachers on children's painting

Please evaluate the following questions according to your actual situation and draw "□" on the appropriate option.

1. I will modify my paintings according to the teacher's suggestion.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

2. I will have more confidence in learning to draw when my paintings are praised by the teacher.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

3. I like to paint because I like the teacher's way of teaching.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

4. I like painting classes because the atmosphere of the painting class is relaxing and

pleasant.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

5. I can grasp the painting method taught by the fine arts teacher.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

6. I will paint completely in accordance with the painting methods taught by the fine arts teacher.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

7. I need to complete the painting creation under the guidance of the fine arts teacher.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

Appendix B

Questionnaire 2

The Impact Test of Parents on Children's Painting

Please evaluate the following questions according to your actual situation and draw "□" on the appropriate option

1. You are willing to support your child's painting activities at home.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

2. When your child has no inspiration for painting you will accompany your children to find creative inspiration.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

3. When your child displays his/hers paintings, you will communicate with he/she about the content of the work and praise him/her.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

4. You prefer your child to learn to draw because you focus on the development of children's drawing skills.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

5. You are willing to let your child learn to draw because you want to cultivate your child (children)'s creative ability.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

6. You are willing to let your child learn to draw because you want to cultivate your child (children)'s imagination.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

7. You know your child (children)'s drawing habits

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

8 You give more praise than criticism to your child (children)'s paintings

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

9. You are willing to discuss the content of paintings (your children’s painting) with your child (children).

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

10. You will pay attention to the creativity of your child (children)'s painting works.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

11. You will accompany your child (children) to finish painting works.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

12. You would like to support your child (children) to have after school painting learning.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

13. You would like to support your child (children) to have after school painting practices.

extremely disagree

strongly disagree

a little bit disagree

moderately

quite a bit agree

strongly agree

extremely agree

Appendix C

Questionnaire 3

The impact test about the usage of painting materials in children's painting works

Please evaluate the following questions according to your actual situation and draw "□" on the appropriate option.

1. When creating painting works, I prefer to use different painting materials to change the color and shape of various objects.
disagree
moderate
agree
2. I can use different painting materials to draw lines of different shapes and colors to draw animals and plants.
disagree
moderate
agree
3. I think it is interesting to try to use new painting materials.
disagree
moderate
agree
4. I like to use different painting materials to imitate other people's paintings.
disagree
moderate
agree
5. I like to draw the same objects with different painting materials.
disagree
moderate
agree
6. I think that all objects can be created with flexible painting materials.
disagree
moderate
agree
7. The painting materials I use in paintings are sometimes influenced by materials in works such as animation works, advertisements, and painting albums.
disagree
moderate
agree
8. I will use different painting materials to create paintings according to the advice of the fine arts teacher.
disagree

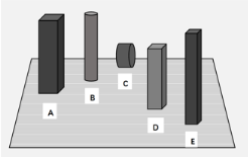
moderate
agree
9. What kind of material do you usually like to draw with (painting tools).
A. color pen
B. color pencil
C. crayon
D. pencil
E. oil pastel
F. acrylic pigment
G. gouache pigment
H. watercolor material
10. What kind of material do you usually like to draw with (painting media material).
A. sketch paper
B. card paper
C. Chinese painting paper
D. watercolor paper

Appendix D

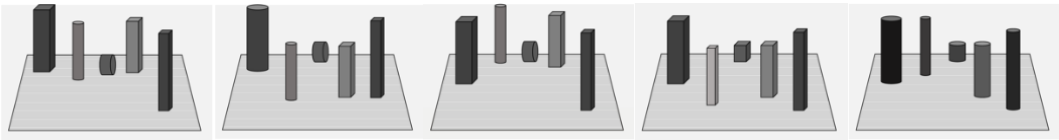
Questionnaire 4 (include answers)

Children's Painting Ability Test

1. Please select the figure which has the most similar positional relationship with the figure X. **(e)**



X



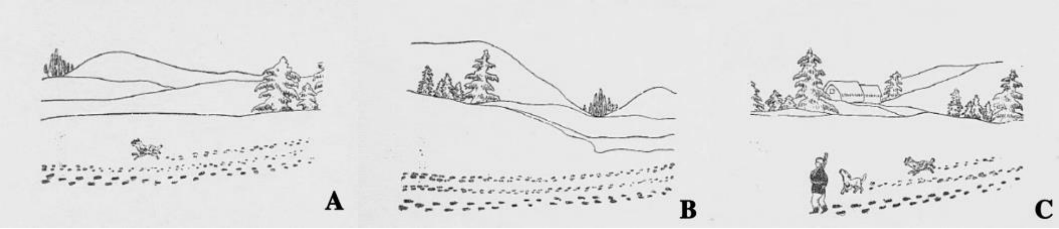
(a) (b) (c) (d) (e)

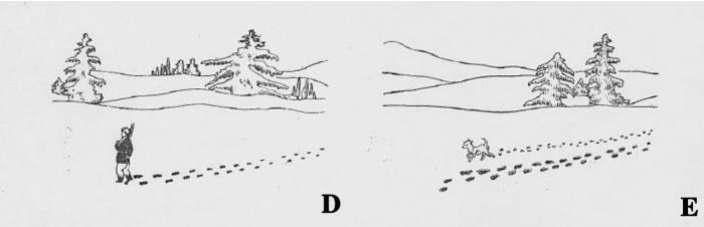
2. Please select the figure that is most similar to the composition of Figure Y. **(e)**

Y

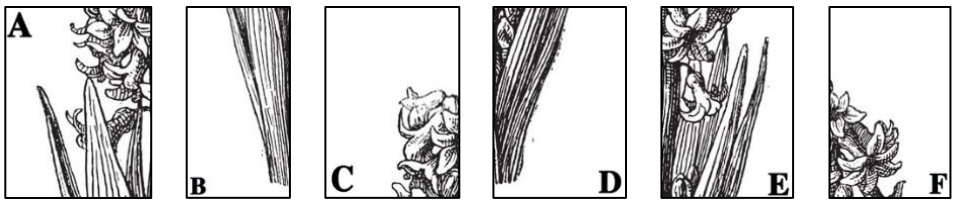
(a) (b) (c) (d) (e)

(DEACB) 3. Please sort the figures A, B, C, D, E in order (from first to end).





4. Please sort the figures A, B, C, D, E, F in order (from first to end). **(CFAEBD)**



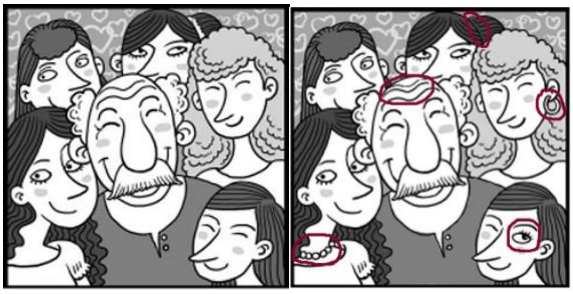
5. Please sort the figures A, B, C, D, E, F in order (from first to end). **(CDAFBE)**

6. Imagine you pour half a bottle of water into the glass. Please draw lines on the bottle and glass to indicate the inverted glass bottle and half a glass of water.

7. Please draw lines on the five glasses. And use the line on the cup to indicate that the water in the glass is getting less and less until the water is gradually drained.

8. Please draw lines on the five glasses. And use the line on the cup to indicate that the water in the glass is getting less and less until the water is gradually drained.

(five) 9. How many differences are there in these two figures?



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List of Publications and Presentations

Papers Published in Journals

1. Lan Yu and Yukari Nagai, An Analysis of Characteristics of Children's Growth through Practical Art, *Healthcare*, Volume 8, Issue 2, 109, 2020 (SSCI, Available in SSCI)
2. Lan Yu and Yukari Nagai, Painting Practical Support: A Study about the Usage of Painting Materials in Children's Painting Works, *Social sciences*, Volume 9, issue 4, 33, 2020 (Scopus, Available in Scopus)
3. Lan Yu and Yukari Nagai, Research About Children's Painting Education Method Based on House Tree Person Test, *West East Journal of Social Sciences*, Volume 8, issue 1,1, 2019 (SSRN, Available in SSRN)

Conference Proceedings

1. Lan Yu and Yukari Nagai, A Study of the Effect of Parents on Children's Painting Learning, in press, 8 pages, February 11-13, 2020, *The WEI International Academic Conference on Education & Teaching and Learning in Barcelona*, Spain (SSRN, Available in SSRN)
2. Lan Yu and Yukari Nagai, Research About Children's Painting Education Method Based on House Tree Person Test, in press, 14 Pages, November 13, 2018,*The WEI International Academic Conference*, Rome, Italy (SSRN, Available in SSRN)