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# Color Education in Technical-Vocational High Schools through Visual Sign (Experimenting with Models) and its Impact on Students' Academic Success

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## Abstract

The purpose of this research is to determine the effect of teaching color knowledge on student's educational success in visual arts' course in private schools and governmental ones –affiliated with technical-vocational colleges. The objective is not only to increase efficiency in educational activities, but also, would be a framework for other educational activities.

The 11th grade students from technical-vocational high schools in Tehran was selected as the case study. The color knowledge of visual arts course was the subject instructed for this population through two different methods; one as experimental group, another as control group, which both was selected at random. The color knowledge taught with the materials supports in experimental group, and through classical method in control group. In order to determine the effect of teaching methods in students' academic achievement, Pre and post testing designed for the control group. As a result of applied tests on the experimental and control group before and after teaching the subject. It was found that the success of the experimental group using materials, was greater than the control group taught through classical method. Therefore, it was found that teaching the subject of "color knowledge" using materials contributes to students' academic success.

*Keywords:* Art Education; Color Knowledge; Visual Arts; Visual Design

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## 1. Introduction

In principle, the purpose and necessity of art education is striving to glorify the human soul, to liberate human beings, to satisfy spiritual needs of individuals, to create a sensitive, modern and balanced society (Erturk, 2013). In art education, accordingly, the goal is to strengthen the cultural structure of society, adopt cultural values, create spiritual satisfaction and make available the people who are environmentally sensitive. It has been seen that individuals or communities who have received good art education have fewer mental issues or show greater sensitivity to what is happening around (Zor, 2008).

Because the visual art (painting program) is one of the fundamental courses affecting the student's success, it is mandatory to consider this course as a multidisciplinary art and use the materials to increase efficiency. In another words, in art learning models, it seems that learning centered around topics which are absorbed by means of more than one sensory organ (Coruhlu, Nas ve Cepni, 2009), and learning by seeing is more efficient than learning by hearing.

According to research from the University of Texas, when the time variable is kept constant; most people only can remember 10 percent of what they've read, 20 percent of what they've heard, 30 percent of what they've seen, 50 percent what they've seen and heard, 70 percent of what they've seen, heard and read, and finally, 90 percent of what they've seen, heard, read and touched (Demirel, 2006).

This program is based on empirical comparisons, and much agreed with sensory-based learning, relies on data from Edgar Dale dale's life cone. As it's widely believed in society, art teaching is not a luxury thing, and it is not just for educating talented people, but it's part of personal development necessary for all. The purpose of art education here is beyond Nurturing artists, means construction of aesthetic taste in individuals (Buyurgan and Buyurgan, 2007). A child or young person, through art education, learns to see instead of looking, understand instead of hearing, and feels instead of touching. In short, they learn to be aware, because art education means training of being sensitive. A person who has studied art is both more sensitive and tolerant towards events and the environment around him (Yılmaz, 2007).

In art education, we mainly aim to inform and use this information, when necessary, think critically, and unlocking the creativity power. To this goal, instructors who carry out educational programs have a great responsibility. First of all, they are expected to bring efficiency in teaching and make it more enjoyable, especially for teaching art lessons (painting program). The use of materials, in this case, are of importance in facilitating learning (Celik, 2008).

As art classes are one of the favorite courses that always draw students' attention, it's essential for instructors, to learn how to prepare educational materials, advantages, the practical limitations associated with materials, and how to utilize instructional materials within courses (Uşun, 2006).

### 1.1. Problem Statement

Does teaching with the help of materials in the visual arts have a structural and positive contribution to the academic success of students?

### 1.2. Objective

The purpose of this study is to investigate the impact of "Color Knowledge" instruction using design materials in the visual arts course on academic success of students. Extending the result of the research, would be effective for furthering other courses.

## 2. Methodology

In this research, 11th in technical-vocational high school's students were taught color knowledge using two different methods for painting course. A group with classical method (training with lecturing) and another training by means of educational materials method were examined. This study employed "experimental design", "control group design", "pre and post testing", which are of experimental methods, and observation and analyzing documents, which are among qualitative research methods. Experimental method (pilot) is a kind of research done to examine the cause and effect relationships between variables by examining each event, phenomenon, person, factor, and then comparing the results (Büyüköztürk, 2001). In this study, pre-tests were performed in several classes. And close results in the two groups -experimental and control group- were formed randomly (neutrally). In both groups, before and after training, tests were taken and the results compared.

**Table 1** Pattern of control group and experimental group, before and after test

| | |
|---|---|
| Experimental group | X=01<br>R=03 |
| Control group | X= 02<br>R= 04 |

R: is showing Accidental assignment of individuals to groups, 03 and 01: showing pre and post-test of experimental groups, X: showing the independent variable applied in the experimental group (Variable test), 04 and 02: showing pre and post-test of control groups (Doğan, 2008). Here, model of teaching through materials is taken as an independent variable, and the academic achievement as the dependent variable.

For study, two classes of twenty, totally 40 individuals randomly selected and participated voluntarily as the control and experimental group from technical-vocational high school at Tehran, for painting course. For the validity of research study, it kept as secret which group was the control group.

Due to their presence in nature and environment, colors can imply various meanings in humans (Artut, 2004). To better teach students about the relationship between colors, color saturation, chromatic color, first and secondary colors, etc.) Color Circle best explains these principles and inter-color relations (Erbaş, 1996) (Fig 1). Accordingly, this colors which shown on a pinwheel as a moving visual material, features three level. First; Blue and yellow, the latter; Blue and red, third; Red and yellow (Fig 2).

For measuring teaching method efficiency, training was provided for the control group and for the experimental group in three forms of narration/storytelling, lecturing and presentation with material support. At last, post-test applied at the end of the lesson and the results shown as Table 2 and 3.

**Fig 1** Color circle

**Fig 2** Pinwheel based on color theories

2.1. Data

To collect the required qualitative data about the effect of teaching on students' academic achievement, a simple pinwheel –based on color theories- and an Achievement test containing 20 questions prepared (Appendix). Achievement tests are those that are prepared and applied to determine students' academic achievement in terms of knowledge, concept and understanding at the end of a specific program (Yildirim, 1999). Such tests should use highly discriminatory sampling means covering the subject so that distinguish between those who know and those who don't. In this regard, one of the basis considerations is to prepare equal opportunities in terms of learning environment when establishing a progress test for experimental and control groups (Doğan, 2008).

The test focused on color information questions and its achievements. In order to determine the level of pre-learning from the studied topics, five questions were added to 15 questions of content measuring, totally 20 questions designed and evaluated by experts.

2.2. Hypotheses

During the testing process, students were not affected by external factors and setting in which the test was held. Their answers, as a result, supposed to be error-free and do not affect each other.

## 3. Finding and Analysis

In the study, pre and post-training achievements tests were taken from both experimental and control groups and the results were compared as the following chart.

**Table 2** Results of pre-test progress test of experimental and control students with the subject of "color knowledge".

| Groups | Students | Arithmetic mean | Weighted mean | Mode |
|---|---|---|---|---|
| Control | 20 | 47.50 | 55 | 55 |
| Experiment | 20 | 47.75 | 50 | 55 |

As shown in Table 2, there is no significant difference between the pre-test results, and it means students have general information about the topics have been taught. These findings show that pre-teaching student information in both classes is statistically equivalent. Although the scores seem low, in the board, the test of really successful and unsuccessful progress is separated and it can be said that they have achieved success as a group.

In average evaluation, Although the student success rate is slightly lower than average, it can be noted that in art education, there is a level of overall success, a good level of pre-learning and a certain level of preparation. It can be said that with good training and the right method at the right time, maximum efficiency would be obtained.

When all the students' scores (pre-test) reviewed one by one, it was found that they generally knew the definitions of line and point, which is one of the basic topics in art education, and they remembered some basic information about perspective. Observed data indicate that a small number of students recall inanimate nature and pencil techniques with their background information.

As an example of color knowledge, some students had general information about color during their school, but were unaware of its details (color theories). They did not know much about color terms in particular, and faced with difficulty for answering. It can be said that questions 1, 3, 6, 9, 10, 11, 12 and 16 were answered correctly by all students and these topics were dominated by students.

**Table 3** Results of post-test taken by the students of the experimental and control groups regarding "Color Knowledge" progress test.

| Groups | Students | Arithmetic mean | Weighted mean | Mode |
|---|---|---|---|---|
| Control | 20 | 58.50 | 55 | 55 |
| Experiment | 20 | 67.75 | 60 | 55 |

After taking the pre-test which lasted for a week, the post-test was taken for measuring student achievement, with this difference that the correct answers fields were displaced. In this way, the students read the questions and pointed out the correct answer with thought. That is, they did not memorize the questions and pointed them out after understanding. As can be seen in Table 3, describing the topic using the material support clearly has changed the test results in favor of the experimental group. The answers show the students' high understanding and sufficient mastery on the subject and support their learning.

In control group, the subject was taught by classical methods (lecturing), and in comparison, to the pre-test results, however shows a significant success in the post-test, it's low in contrast to the

success of the experimental group, but it is still observed that modern education supported by materials is more efficient in practice. Due to dynamic structure of art education, it cannot continue to be effective unless it follows contemporary developments and changes. This dynamic structure calls for a rich educational environment equipped with technological materials. The teaching methods used in the educational setting vary according to the interests, abilities and perceptions of each student (Sarıkaya, 2006). The important point here is to opt for something that attracts the students' visual-auditory comprehension characteristics and makes the teaching enjoyable and fruitful while using a valid method. It can be said that this is the main point that contemporary education emphasizes on.

One of the statistical results of this test is that questions were marked correctly by most students successfully. The high level of success should be interpreted to that lesson is well taught and the highest performance is achieved, and it's equal to the simplicity of the questions or the distinctiveness of the test. After reviewing the answers that the students made to the test questions, it can be said that they've reached a good knowledge of color topics and competency for analyzing the color.

## 4. Conclusion and Suggestion

Undoubtedly, the value and importance of color in art education is undeniable. Accordingly, color knowledge training should be emphasized and considered in educational activities. The main goal for students is not only to look but also to see with the new awareness they have gained during the color training process (Erbaş, 1996). Here, the goal should be to achieve maximum efficiency regardless of the subject being taught, to improve the student's emotional and cognitive development, understanding and interpretation skills.

Based on the above information, this research once again proved that the using educational materials is one of the most important factors that could increase academic success, students' interest in the lesson and motivate and influence them for educational activities.

This study ensures that material usage is an integral part of education so that would be applicable for other courses. In this research, it was shown that similar studies should be considered and developed in form of a model, especially in education field, where art education has an important place.

At least for future generations, there is still time to provide up-to-date teaching equipment and materials (Bölükoğlu, 2002). The technical classes of all schools must be equipped with modern equipment to prevent any problems in the preparation and manufacturing of educational materials.

Teachers should be particularly aware of materials usage skills and stands for the follow-up process. In order to follow the last developments of national and international art education methods, they must be periodically directed to in-service training programs to be nurtured with the participation of competent art educators (Alakuş, 2002). Schools should be equipped in a way that allows performance-based programs implementation (Gelisli, 2007).

Teachers should plan activities that make teaching enjoyable, increase the quality and efficiency of teaching without discriminating, and make the use of the material in the lesson a top priority. In choosing educational materials, it's important to consider student characteristics, appropriate adjusted methods and the best time to get the best result from.

If the scores obtained by students are supported by other measurement tools and evaluation criteria such as process and performance observations, it can be said that the success of the art (painting) course will be achieved with a more modern approach (Alakuş, 2004).

To prevent students from the negative attitude towards the art course with a fear of getting bad grades, they should be replaced with activities such as sample work, setting up exhibitions and evaluating their performance, which are contemporary evaluation criteria.

In terms of determining suitable principles and methods, it is a necessary for the art lessons to be prepared by specialists, separately for the first and second grades of elementary schools, and for the third, fourth and fifth grades separately in two stages. These programs should be flexible and it is important for the teacher to be able to prepare the necessary materials while taking into account the environmental conditions.

Due to the environmental conditions of schools, materials, schools and classrooms should be equipped with modern technology. Establishing smart classes similar to developed countries, would be the way to increase efficiency in educational activities.

In general, educational art activities would increase efficiency in other subjects, because students recognize their feelings-thoughts, become aware of their latent power, develop their creativity power, and become critical of the events around them. It is the reason behind of why in developed countries, art education courses are among the compulsory courses (Kavuran, 2003).

Given this fact, it is necessary for academics and educators to consider the art education course as a compulsory course, especially it's expected from the Ministry of Education to increase the duration time of the course and consider art as a tool and a springboard for the progress of our country.

Undoubtedly, we cannot name a country that has progressed in science and technology, but lags behind in the field of art. In today's developed world of science and technology, art is at the forefront of all progress (Avcı, 2012).

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## Appendix

Measurement Tool

1. What is the name of the artistic element resulting from the movement of moving points in a specific direction?
   a. Line
   b. point
   c. Paragraph
   d. Handicraft (skill)

2. What is the border line of shapes in pictures or paintings?
   a. Wallor
   b. point
   c. The meter
   d. Rhythm

3. Which of the following is included in both audio and visual arts?
   a. Literature - music
   b. Poetry - painting
   c. Cinema - Sculpture
   d. Theater-Ballet

4. In which artistic subject in cases such as; Is there a point of intersection, a horizon line, a point of view, a ground line, ...?
   a. In the subject of sculpture
   b. In relation to the subject of criticism
   c. In relation to the subject of perspective

d. In relation to miniatures

5. What does the term naturalism mean in the teaching of the visual arts?

a. means abstract painting design.

b. means inanimate nature.

c. It means figurative painting.

d. means animated painting technique.

6. Which of the following is the original color?

a. orange, b. green, c. yellow, d. purple

7- Why are colors called "original" colors?

a. Because they are obtained without mixing with other colors.

b. Because they are beautiful and impressive.

c. Because they are composed of three colors.

d. Because they are in the center of the color circle.

8 - Why colors, secondary colors, “second-class” called?

a. Because it is found in nature alone.

b. Because they are obtained from soil.

c. Because they are used as home paints and paintings.

d. Because they are composed of a combination of two different colors.

9- From the mixture… with ... green color is obtained.

In which case are the most appropriate words for the spaces above?

a. Orange and red

b. Blue and yellow

c. White and blue

d. Purple and blue

10. Mixed ... with ... purple obtained.

In which case are the most appropriate words for the spaces above?

a. Black and red, b. Red and blue, c. Yellow and blue, d. Green and blue

11- Which of the given options is below the correct color sequence of the main colors?

a. Red, orange and green

b. Red, yellow and green

c. Yellow, blue and red

d. Yellow, green and orange

12 - The mechanism in which the main and intermediate colors displayed in a special systematic, what to say?

a. Color harmony, b. Color riot, c. Color circle, d. Color key

13- Which of the following two items are not considered as color?

a. Black and red, b. Red and yellow, c. White and blue, d. White and black

14. Which of the following is a neutral color?

a. orange, b. red, c. blue, d. gray

15- The color that exists in the color circle in front of the combination of the two main colors ... is called.

a. Complementary, b. Neutral, c. Subtle difference, d. Contrast

16- Grays are formed by combining black and white colors with each other?

a. Contrast colors, b. Complementary colors, c. Neutral colors, d. Thin colors

17- What do we say about mixing any color with neutral colors?

a. Tonality, b. Neutral, c. Contrast, d. Spectrum

18- Which of the following is a warm color?
a. white, b. orange, c. blue, d. black
19. Which of the following is a cold color?
a. red, b. white, c. blue, d. black
20. In which option is the yellow contrast given correctly?
a. red and white, b. white and black, c. blue and red, d. black and red