Using a Proposed Program Based on Johannes Itten's Theory of Color in the Development of Color Culture among Faculty of Early-Childhood Education Students

Asmaa M. I. Musa, Nasser F. Gubeesh, Hassan M. Al-Hajan
Minia University, Egypt

Abstract

The current study was prepared on the basis that color is one of the most important visual elements of the creativity of the artistic work due to its role in highlighting aesthetic and expressive values with the diversity of its color relations as well as its ability to show ideas and to increase attention, in addition to the use of color to show form and to increase motivation for learning. This study aimed to investigate the effectiveness of a proposed program based on Johannes Itten's theory of color to teach color to the students of the Faculty of Early Childhood Education in the development of their color culture. The material and instruments of the study included a proposed program based only on watercolors, in addition to a performance scale for color culture. The sample of the study consisted of (30) students of the third year at the Faculty of Early Childhood Education. The study findings showed that there are statistically significant differences between the mean scores obtained by the study participants on the pre and post administrations of the performance scale of color culture in favor of the post-administration. Thus, the present study proved the effectiveness of the proposed program in the development of the color culture among the student-teacher at the Faculty of Early Childhood Education.

Keywords: Color Theory - Color Culture - Faculty of Early Childhood Education Students.

Introduction

Color is considered to be essential in every work of plastic art and it is the element that characterizes the physical art forms that can be seen and observed directly. As colors give a great joy to the eye, the eye needs color as its need for light, and colors provoke emotions and renew vision, in addition, through colors the artistic product turns into a perceptible visual reality. Therefore, the process of using colors is a critical artistic matter, as a person who is aware of his mental capabilities and cultural experience can taste and appreciate the color depth or warmth that arise from the graduation, compatibility or contrast in colors.

Shawky (2010) defined color as the physiological effect (*relating to the functions of the organs of the body*) caused by the retina, whether it is caused by colored pigment or by colored light. Color is therefore a sensation and does not exist outside the nervous system of living creatures. Moreover, Abdul-Rahman (2007) stated that color's definition is based on the eye's perception of the color, which may be physical, physiological or chemical. Color can be defined physically as the bounced or reflected radiation from things to the eye after light falls on these things. It is an internal feeling, that is, it does not exist except within the

nervous system of living beings. While chemically, color is a name given to dyes or paints that are used in the fields of visual arts, including Graphic Design and Painting.

Cézanne defined it as the element that defines the shape, not by modifying the purity of the shape's color, but by describing it in the extension of relativity that creates illusions in form. Color carries the shape directly regardless of light and shadow, as when the color gets its wealth, the shape gets its fullness and its eminence (Herbert, 1986).

It is worth mentioning that the German scientist Johannes Itten is one of the greatest pioneers of color theories of the modern time and is a lover of colors, and from his famous words " Color is life; for a world without color appears to us as dead " (Abdul Rahman, 2007). Itten simplified the previous color systems into a wheel (circle) consisting of twelve colors placed in the equilateral triangle, theoretically establishing the blending of primary color materials: yellow, red, and blue for secondary colors: orange, violet, and green, and then blending these secondary colors to obtain the derived tertiary colors (Shawky, 2010).

When we examine the characteristics of the art of color, we note that there are seven different types of color variations which are different from each other in terms of character, value and internal color relationships contributing to creating such type of contrast. Johannes Itten has classified color variations into seven types in his book "Kunst der Farbe" meaning THE ART OF COLOR that was translated into many languages. These seven types are as follows:

1) Contrast of Hue.
2) Light- Dark Contrast.
3) Cold- Warm Contrast.
4) Complementary Contrast.
5) Simultaneous Contrast.
6) Contrast Saturation.
7) Contrast of Extension. (Abdul Rahman, 2007)

As for the concept of color compatibility, Johannes Atten emphasized the process of sensory integration to achieve the physiological balance of the eye and then the human mind. As the eye evokes subsequent mental images (*afterimage*) immediately, to be complementary to the color to which it is exposed. The color group is in a state of compatibility and harmony if the result of their mixing is the average gray (Abdul Rahman, 2007). Johannes Itten has divided the color compatibility into color combinations of two, three, four or more colors, called the bilateral, triple, quadrant and sixth compatibility.

Since it is important for the environment of the child to include an excitement of different shapes, sizes and colors, the activities of art education appeared to achieve this. Because these activities help the child to master the experiences with their multiplicity of fields and skills. They are among the basic experiences provided by the kindergarten to children in its programs and therefore they are one of the methods that provide the kindergarten child with different experiences and knowledge besides the development of his/her sense of beauty and art.

Kindergarten stage is the critical formative period in the life of the individual, and its goals are inseparable from those of education in general. Thus, if education aims to build a good citizen, kindergarten aims to

develop the child's personality in all physical, mental, emotional, social, and cultural aspects, help the child to express himself/herself and their imaginations and develop them, integrate with peers, develop his/her ability to solve problems, qualify the child for the natural transition from the family to school after the age of six, develop his/her self-confidence as a human being, and solidify the relationship between the child and his/her teacher.

Kindergartens include cognitive, psychomotor, and linguistic activities, and effective social and human attitudes, in addition to the practices that contribute to the formation of simplified scientific concepts, instilling religious and national values, as well as promoting the sense of beauty. These all are achieved through the processes of teaching and learning based on free activity and play, affirming the principle of self-learning and independence, and the individual and collective work. (Al-Kantar et al., 2003).

The study of Abdul Rahim (2015) revealed the effectiveness of the artistic activities in the development of children's visual memory and as well as their creative thinking. Therefore, it is necessary to strengthen the educational environment of the child with visual stimuli that nourish the children's visual memory, as it is the mental process by which the recording, retention and retrieval of past experience are done.

Color is one of the strongest visual stimuli since it is the first attraction of the child's eyes. The child's awareness of the color gradually increases, and the child realizes the explicit colors without any trouble or fatigue. In addition, the color, to the child, complements his/her layouts, and serves his needs and purposes of drawing. It also performs an auxiliary aesthetic function for child’s layouts, and the child feels pleasure and excitement. Color is an important element in the formation of the image. As the importance of the shape lies in the harmony of lines and colors with each other (Jodi, 1999)

Nassar (2008) stated that "Travers" indicated that color makes it easier for the child to perceive and remember images that may be complex or include dynamic manifestations because color gives more realism for the pictures. Besides, the child may use color to remember things, as in an experiment on remembering of children between 2:5 years, half of the children remembered, after a period of 21:29 days, the dish that was put under dessert once between 3 dishes by the verbal symbols as well as colors used.

Furthermore, the study of Gubeesh (2010) also confirmed the importance of the picture colored in the basic colors to the kindergarten child because they are considered more attractive to the kindergarten child, and therefore came in the first place to the standards of reading the picture in the publications addressed to the kindergarten child.

The study of Engelbrecht (2003) presented some functional guidelines and instructions that make color an important factor in school learning, including that the use of colors increases the child's productivity and attention, and that learning in the kindergarten stage must be rich as well as full of the use of colors, which contributes to the creation of a learning environment that stimulates children's educational experiences.

To add, the findings of the Study of Al-Sourdi (2005) showed that the child can be educated first by the perception of simple composite colors, such as orange which is a combination of yellow and red, to the realization of color complexities as well as tasting the effects of colors.

The success of the educational and learning process is not achieved without a well-prepared teacher, and therefore it is necessary to prepare a kindergarten teacher who is the main pillar that achieve the goals of

the kindergarten. Thus, it is necessary to prepare and train the student-teacher, and pay attention to the competencies that student-teachers at Faculty of Early-Childhood Education must possess. It is desirable that they have creative and innovative capabilities and skills in order not to weaken children's creative abilities (Abdul-Rauf, 2008).

Therefore, the study of Abdel-Mawla (2011) confirmed the need of the teacher of art education in kindergartens to have a high artistic culture and preferably to have a technical certificate. Additionally, the study indicated the necessity for conducting training courses in art education for early childhood teachers to keep up with the latest scientific developments.

In this regard, the study of Ciftci & Temel (2011) confirmed that, in accordance with the statement issued by the Council of Education and Early Childhood Affairs in 2007, high quality art education should be provided for all young children. This statement supports the concept that technical expertise can be meaningful and the first useful part of a child's integration into the learning environment. In order to achieve quality in art education, the teacher is required to have a high level of skills and training, and this requires the teacher to receive training that helps him/her to develop their sense of ability to teach arts.

In addition, the study of Garvis (2012) revealed a correlation between the use of artistic activities and practices with children, and the philosophy of teachers about art education during their preparation phase as teachers. The study also emphasized the importance of art education and its activities in kindergarten and early childhood teacher preparation programs.

Therefore, the current study sought to present an educational program (proposed artistic activities) in the teaching of color to student-teachers at Faculty of Early-Childhood Education and. This study came as a result of the researcher’s observation of some kindergartens and monitoring of the reality of early childhood education, as well as the use of artistic activities that depend on the use of watercolors. Based on that observation, it was found that early childhood education depends on poor level artistic activities, and that the learning environment in kindergartens suffers from lack of excitement and attractiveness. That is to say these environments lacks to the functionalization of works of art and colors in educational materials provided to the child.

Moreover, through surveying the points of view of early childhood teachers, the teachers emphasized the desire and need to develop their artistic ideas. Besides, they pointed out that they do not know the characteristics of colors and their techniques. Additionally, through monitoring the reality of the preparation program of student-teachers at Faculty of Early Childhood Education, the researcher noted that it does not pay enough attention to the field of color and the use of its techniques. That was clear through a questionnaire that the researcher administered to the students of third and fourth grades at Faculty of Early Childhood Education. That questionnaire included some open questions whose dimensions addressed the topic of colors and how to use them. Based on the questionnaire’s results, the researcher reached the need of students to know more in the field of art education in general and in the field of colors in particular, in order to know the difference among the types of colors and how to make gradients for one color (color grading), as well as how to mix colors and extract new grades. The questionnaire also addressed the method of holding the brush and its sizes, color classifications and color circle (wheel), and how to introduce new techniques in coloring. The students expressed their desire for having practical application of colors and increasing their color culture. As the Fine Arts course cannot meet all of their artistic needs, which is an

obstacle that hinders the way of developing the basic skills of using colors for student-teachers at Faculty of Early Childhood Education.

Moreover, through reviewing the related literature, the researcher found many studies that addressed the importance of the development of plastic art skills of student-teachers at Faculty of Early Childhood Education, such as the study of Kholi (2010) that investigated effectiveness of a program in developing early childhood teachers' awareness of some artistic skills and environmental crafts necessary to be employed within the kindergarten. This study aimed to identify some environmental crafts (handweaving, hand-embroidery, palm products) and to design a program for the development of early childhood teachers' awareness these environmental crafts and the artistic skills necessary to employ these crafts within the kindergarten.

Besides, the study of Abdul-Ali (2009) aimed to explore the effectiveness of a proposed program in the development of manual artistic skills and innovation by using environmental materials among the student-teachers at the Faculty of Education. This study aimed to identify the artistic skills necessary for early-childhood education student-teachers at the Faculty of Education and to design a program to develop these artistic skills and innovation through the use of environmental materials.

Mousa (2008) also presented a proposed program to equip the student-teachers at the Faculty of early-childhood education with artistic expression skills using the mural aesthetic and functional formations inside and outside the activity classroom, as well as to develop new units of shapes on the wall of the kindergarten used to help in the learning process inside the activity room. In addition, Ahmed (2008) investigated the synthesis of materials as an approach to equip the student-teacher at the Faculty of early-childhood education with the plastic art skills to embody the elements of the picture stories.

Similarly, the study of Abd-Ali (2012) investigated the use of an program based on blending (synthesizing) the materials of the environment to equip the student-teacher at the Faculty of early-childhood education with the performance skills needed to create stereoscopic toys in the light of safety and security standards. This study aimed to design a program to synthesize the materials of the environment in an innovative way in implementing the activities of the proposed program (production of stereoscopic toys) to equip the student-teacher at the Faculty of early-childhood education with the performance skills. Finally, Yassa's study (2011) aimed to explore the impact of designing a documentary portfolio in art education on the development of reflection among early childhood teachers in light of the twenty-first century skills.

Through reviewing the above-mentioned studies, it made clear, to the researcher, the importance of developing the aspects of the arts among the student-teacher at the Faculty of early-childhood education and the impact of that on their performance afterwards in dealing with the child. To the researcher best knowledge, there are no studies addressed color of among early-childhood education students.

Therefore, the researcher realized that it is necessary to pay attention to the academic preparation of the student-teacher at the Faculty of early-childhood education to learn about the science of color and its characteristics, the plans of using colors, the basic skills of using colors, and the techniques used with colors in order to serve the educational process of the kindergarten child in all fields. This could be achieved through a proposed program considered as an approach for the teaching of color within a structured scientific framework that includes linking knowledge and skill within the limits of the use of watercolors,

which contributes to expanding the perception of student-teachers and their culture of color. Besides, the interest in the study of color theory and its applications is a fertile area for art research.

Study Questions

The problem of the current study lies in the following main question:

-What is the effectiveness of using a proposed program based on the theory of Johannes Itten in the development of color culture among students at the Faculty of Early Childhood Education?

This main question branches out into the following sub-questions:

1) What is the form of the proposed program for the development of color culture among student at the Faculty of Early Childhood Education?

2) What is the effectiveness of the proposed program in the development of the performance skills of using watercolors among students at the Faculty of Early Childhood Education?

Study aims

The current study aimed at:

1. Preparing a program to teach the theory of color of Johannes Itten to students at the Faculty of Early Childhood Education.

2. Measuring the effectiveness of the proposed program in developing the performance skills of color culture among students at the Faculty of Early Childhood Education?

Methodology

The present study adopted the quasi-experimental design based on one group (an experimental group) who were pre-tested and post-tested on the instruments of the study, and then the differences between the pretesting and post-testing were measured in order to identify the effectiveness of the proposed program.

Study Sample

The sample of current study consisted of the students of the third-year at the Faculty of Early Childhood Education. The application of the study program lasted for one month and a half, namely (9) sessions.

Study Delimitations

The study was delimited to the use of watercolors (joache), to develop the performance skills of color culture only, among the student-teachers at the Faculty of Early Childhood Education.

Study Instruments

The study was delimited to the following instruments:

- A proposed program based on the teaching of Johannes Itten's theory of Color. (Prepared by the researcher)

- A performance scale of color culture. (Prepared by the researcher)

Performance scale of color culture

1. Preparing the preliminary form of the performance scale.

After reviewing the related literature, and determining the aims of the scale, the researcher developed a set of questions, and the number of questions was (26) items.

2. Submitting the scale to the jury members

To verify the validity of the scale, the researcher submitted its preliminary form to a panel of experts in the field of child education and art education, consisting of (10) experts in order to judge the scale and make suggestions on the following points: the accuracy of wording of scale items, the suitability of the scale items for the student-teachers at the Faculty of Early Childhood Education, and the suitability of each item for the skill it measures.

Table (1)

Percentage of Jury Members' Views on Scale Items (N = 10)

Phrase No.	Repetition	Percentage	Phrase No.	Repetition	Percentage	Phrase No.	Repetition	Percentage
1	10	100%	10	10	100%	19	8	80%
2	9	90%	11	9	90%	20	9	90%
3	8	80%	12	10	100%	21	10	100%
4	10	100%	13	10	100%	22	10	100%
5	8	80%	14	10	100%	23	9	90%
6	9	90%	15	8	80%	24	9	90%
7	9	90%	16	4	40%	25	10	100%
8	9	90%	17	10	100%	26	10	100%
9	9	90%	18	9	90%			

It is clear from table (1) that the percentage of the jury members' views on the appropriateness of the scale items ranged from (80% to 100%). Items that received less than 80% of the jury members' agreement have been deleted. In addition, two items have been deleted because they were difficult for the student-teachers at the Faculty of Early Childhood Education as they are not specialized in art. Besides, five items were merged into one item that was to be answered by a single image.

3. Piloting of the scale

After the making the recommended modifications and observations made by the jury members, the researcher administered the scale to a sample consisting of (20) student-teachers at the Faculty of Early Childhood Education, in order to determine the validity of the instructions and clarity of phrases, to

calculate the time of the scale, and its validity and reliability, as well as to identify the difficulties that the researcher may encounter during the application of the scale.

A. Calculating the time of the scale

The time of the scale was determined in the light of the actual performance of the students. The average of the time when the first student ended answering the items of the scale, and the time when the last student finished answering the items of the scale was calculated, and the time of the scale was two and a half hours (2:30 hrs.) plus ten minutes to clarify how to answer the scale items.

B. Determining the clarity of scale instructions

It became clear through the scale piloting that the necessary instructions to respond to the scale were valid, and no complaints were made from the students-teachers regarding the instructions.

C. Calculating the validity and reliability of the scale:

- **Calculating the validity of the scale**

To calculate the validity of the scale, the researcher used the following:

1) Content Validity (Jury Members' Validity):

To verify the content validity of the scale, the researcher submitted it in its preliminary form to a group of experts in the field of child education and art education consisting of (10) experts in order to judge the appropriateness of the scale in terms of the axes, the items of each axis and the appropriateness of those items to the axis they represent.

The percentage of experts' views on the appropriateness of the scale items ranged from (80% to 100%). Items that received less than 80% of the jury members' agreement have been deleted. In addition, two items have been deleted because they were difficult for the student-teachers at the Faculty of Early Childhood Education as they are not specialized in art. Besides, five items were merged into one item that was to be answered by a single image.

2) Internal Consistency Validity:

In order to calculate the internal consistency validity of the performance scale of the color culture, the researcher administered it to a piloting sample (used only in piloting the instruments) consisting of (20) students from the study population. The correlation coefficients between the score of each item of the scale and the overall score of the scale. This is shown in table (2):

Table (2) :Correlation coefficients between the score of each scale item and the overall score of the scale (n = 30)

Phrase No.	Correlation coefficient	Phrase No.	Correlation coefficient	Phrase No.	Correlation coefficients	Phrase No.	Correlation coefficients
1	0.59	6	0.42	11	0.71	16	0.53
2	0.57	7	0.58	12	0.51	17	0.51
3	0.39	8	0.7	13	0.63	18	0.7
4	0.64	9	0.58	14	0.63	19	0.56
5	0.54	10	0.41	15	0.52	20	0.52

The value of tabulated (r) at the significance level (0.05) = 0.361 and at the significance level (0.01) = 0.463.

Table (2) shows that the correlation coefficients between the score of each item of the scale and the overall score of the scale ranged between (0.39: 0.71). Hence, these correlation coefficients are statistically significant. This indicates the internal consistency of the performance scale of the color culture, which reveals the validity of the scale.

- **Calculating the reliability of the scale:**

To calculate the reliability of the scale, the researcher used the following:

1-Test-retest method of reliability

In order to calculate the reliability of the scale, the researcher used the method of test-retest. The researcher administered the scale to a piloting sample (used only in piloting the instruments) of the study population consisting of (20) students, and then it was administered to the same sample with a time interval of ten days. The correlation coefficients between the first and second administrations were calculated to verify the reliability of the scale. The coefficient of correlation between the first and second administrations of the scale was (0.96), which is a statistically significant coefficient of correlation, indicating that the scale has an acceptable degree of reliability.

2- Cronbach's alpha method of reliability

In order to further make sure of the reliability of the scale, the researcher used Cronbach's alpha method. The researcher administered the scale to a piloting sample (used only in piloting the instruments) of the study population consisting of (20) students. After applying the formula, the Cronbach's alpha coefficient of the scale was (0.89), which is a statistically significant coefficient of correlation, indicating the reliability of the scale.

D. Scoring of the scale

When formulating the items of the scale, the following points were taken into consideration:

- the items of the scale have one specific meaning,
- the wording of each item is correct and accurate,
- the scale is devoid of any difficult items
- the scale is devoid of any use of words that carry more than one meaning.
- one item is formulated for each skill, and one answer is required for each item of the scale.

The scoring of the scale was as follows:

- The commitment to achieve the required skill is given a score and the non-commitment to achieve it is given zero.
- Accuracy in using colors ranges between: 2 scores - 1 score, or Zero.

Table (3)

Mean, Median, Standard Deviation, and Skewness Coefficient of the Experimental Group' Scores on the scale (n = 30)

Variable	Mean	Median	Standard deviation	Skewness Coefficient
Performance scale of color culture	22.77	23.00	3.23	-0.21

It is clear from table (3) that the coefficients of skewness of the study sample on the performance scale of color culture range between (-3, +3). This indicates that the coefficients of skewness are located within normal distribution curve, and thus the sample of the study was normal distributed.

Study Findings

The hypothesis of the study states that: there are statistically significant differences between the mean scores obtained by the study participants on the pre-administration and post-administration of the performance scale of color culture in favor of post-administration.

The performance scale of color culture was administered before the program was taught as well as after the completion of the program's teaching to the study group. The "t" formula was used to identify the differences between the mean scores of the participants of the study on pre-administration and post-administration the performance scale of color culture. Due to the fact that the *t-test* is an indication of the significance of differences, i.e. it indicates the extent of confidence in the existence of the difference between the two administrations, regardless of the size of this difference; this requires the identification of the size of this difference. To do this, the researcher has calculated the Eta squared.

Table (4)

Significance of the differences between the mean sores of the study participants on the pre-administration and post-administration of the performance scale of color culture

(N = 30)

Scale	Pre-administration		Post-administration		t- value	The level of significance	Ita^2 Value
	Mean	Standard deviation	Mean	Standard deviation			
Performance Scale of Color Culture	22.77	3.23	67.30	5.03	48.57**	0.01	0.99

The value of the Tabulated (t) value at the significance level (0.05) = 1.67.

* Significant at the level (0.05) ** Significant at the level (0.01)

By examining the results included in the previous table, it can be concluded that:

- there are statistically significant differences between the mean scores obtained by the study participants on the pre-administration and post-administration of the performance scale of color culture in favor of post-administration. The differences between the mean score obtained by the study participants on the pre-administration and post-administration of the performance scale of color culture are statistically significant at the level of (0.01) in favor of the post-administration. This means that there is a positive change in the study participants' (student-teachers) acquisition of performance skills of using color as a result of their exposure to the experiences provided by the proposed educational program, as well as the effective impact of the activities of the program on the participants throughout the period the experiment led to the development of their color culture.
- It is also clear from the previous table that the value of ETA squared that indicates the effect size as well as the effectiveness of the color culture scale is (0.99). This value indicates that the effect of the independent variable on the dependent variable is big, and thus the hypothesis that "there are statistically significant differences between the mean score obtained by the study participants on the pre-administration and post-administration of the performance scale of color culture in favor of post-administration", is accepted and confirmed. This difference can be attributed to the effect of training the study participants on the activities of the proposed program, prepared by the researcher, for teaching color. Because this difference is statistically significant at the level of (0.01), there is a positive impact of the program on developing the color performance skills of the study participants. As the program included various integrated activities, which helped to stimulate the student's motivation for learning and to increase their curiosity about knowing the color materials, color relationships and attractive coloring techniques

The following figure shows the difference between the mean scores obtained of the study participants on the pre-administration and post-administration in the performance skills of color culture.

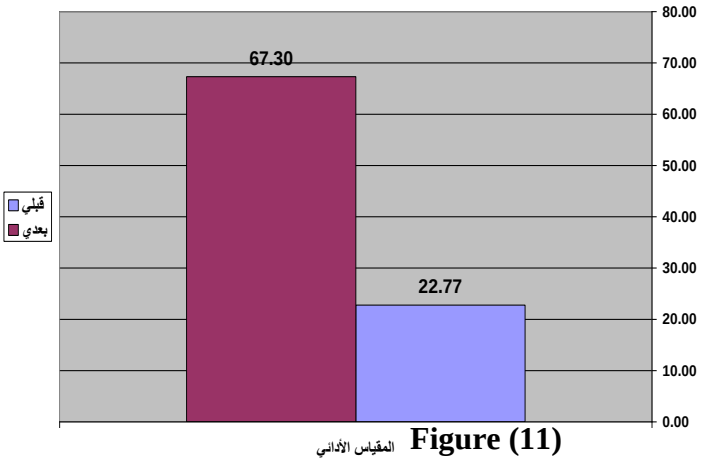

Figure (11)

Differences between the mean scores obtained by the study participants on the pre-administration and post-administration of the performance scale of color culture.

Discussion of study findings

The findings of the current study show that there are statistically significant differences between the mean scores obtained by the study participants on the pre-administration and post-administration of the performance scale of color culture in favor of post-administration compared with the pre-administration. This statistically significant differences improvement is due to the positive impact of the proposed program. The effectiveness of the proposed program based on the teaching of Johannes Itten's theory of color in developing students' performance skills is attributed to its range of artistic activities. In addition, the training of student-teachers (study participants) at the Faculty of Early Childhood Education, in the artistic activities helped them to:

- Produce some decorative designs that were characterized by contrast or color compatibility.
- enhance their visual vision and increase their visual storage,
- Increase their consideration of the characteristics of colors in terms of being cold or hot.

The findings of the present study are in line with many studies that investigated the effectiveness of color teaching in enriching arts, such as the study of Nasra (2013), Abbas (2012), as well as Johan, Hashimoto & Nishita (2004).

In regard with colors, Itten has mentioned that: "He who wants to become a master of color must see, feel, and experience each individual color in its many endless combinations with all other colors " He also added that: "Colors must have a mystical capacity for spiritual expression, without being tied to objects" (Abdel Rahman, 2001).

The findings of the present study also revealed the effectiveness of the proposed program in the development of the skills of using watercolors among student-teachers at the Faculty of Early Childhood Education. This is consistent with many studies that conducted on the development of the fields of arts among Early Childhood student-teachers, such as the study of Abdul-Ali (2012), Mohammed (2010), Musa (2008), Mohammed (2008), and Mohammed (2015).

The proposed program of the current study included teaching the concepts of color. This led to increasing the cognitive aspect of the color culture among student-teachers at the Faculty of Early Childhood Education.

The researcher addressed watercolors and provided the students with a set of watercolor techniques and helped them enjoy the effects of spontaneity of watercolors with other materials in terms of the harmony and diversity of color gradients and the spread of color on the surface of paper smoothly. This led to increasing the visual storage of these students and thus increasing their color culture. The researcher used, in these experiments, gouache colors, as they are characterized by the variety of colors, which are dark colors that can be combined in several ways including pouring and splatter, and give us multiple results. They can also be diluted with water and moved in different ways. Pouring colors is a technique that allows colors to spread in different ways, and the colors have large centers. Then, colors are moved by adding some water drops or using brushes.

The researcher used color isolation and color erasures using paper napkins and scratches. Color overlap investment and Splashing were also used, which is a method of obtaining tangible effects by dripping through various tools, such as paintbrushes, toothbrushes, and airbrushes. All these artistic techniques, coloring tricks and the experience of using innovative effects led to students' enjoyment of artistic experiences and artistic creativity through distributing color spots automatically and overlapping them randomly leading to unexpected results. This led to deepening the students' knowledge of watercolors and being able to perfectly use them through experimentation and practice. This is consistent with the study of Al-Baghdadi (2006) and the study of Mahmoud (2009).

Bitar (2000) referred to the importance of color by saying, "Give color all your energy, it gives you all its secrets from variations contradictions, as well as harmony".

The current study presented the concepts of color theory using images and layouts that represent infographics helped to quickly understand the topic of color and develop color culture. This is consistent with the study of Mohammed (2018), which revealed the effectiveness of the use of Infographic in enhancing students' acquisition of the concept of color.

The variety of materials, tools and ideas used in the proposed program has stimulated the motivation of students to participate in the activities of the program, and to increase their motivation to learn more in the field of color. Such activities included in the program increased students' creative aspect, which made them more visually experienced and aware of the artistic culture.

The training provided through the activities of the program went according to a gradual and integrated plan, as well as the factor of time allocated to the activities of the program had a positive effect on achieving the aims of the study. As each activity was given the suitable time in accordance with the abilities of the study participants.

Providing feedback during and after performance has had a significant effect on enhancing the good performance of the study participants, and correcting the wrong performance. In addition, the variety of evaluation methods used in the program has had a positive impact on following up performance and addressing weaknesses of students.

Study recommendations

In light of the findings of the current study, the following recommend- ations were drawn:

- opening the way for student-teachers at faculties of early childhood to deepen the study of color through continuous workshops.
- training early childhood teachers through training courses on how to mix colors, form color groups and employ them in the activities provided to the kindergarten child.
- Motivating student- teachers to pay attention to artistic activities through holding competitions for artistic creativity.
- emphasizing the importance of using watercolors and their various techniques in the works provided to the kindergarten child.

Suggestions for further research

In light of the findings of the present study, the following suggestions for further research were drawn:

-Using a proposed program in teaching the physiological and psychological dimensions of color to develop the color culture of student-teachers at the faculty of early childhood.
- The effectiveness of the use of e-learning in the development of color culture student-teachers at the faculty of Early childhood.
- Using a proposed program in artistic activities for the development of oil color techniques among student-teachers at the faculty of Early childhood.

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