



EMPLOYING PHOTOSHOP IN PRODUCING ART WORKS FROM RAW MATERIAL AND CONSUMED WASTE

HAM MATERYALLER VE ATIKTAN SANAT ESERLERİ ÜRETMEKTE PHOTOSHOPUN KULLANIMI

Associate Prof. Mowafaq Ali Alsaggar*, Ala'a Al Thenat**

*Yarmouk University Faculty of Fine Arts, Visual Arts Department, alsagar@yu.edu.jo,
ORCID: 0000-0002-2854-2093

**Jordan University of Science and Technology, Center for E-Learning and Open
Educational Resources, ahtheinat@just.edu.jo, ORCID: 0000-0002-2854-2093

ABSTRACT

The purpose of the study was to examine the effective use of Photoshop software in reproducing the visual image in the handicrafts presented at visual arts department, faculty of fine arts, Yarmouk University. Another purpose of the study was to capitalize the various uses of consumed wastes and raw materials recycling in art works innovation contributing in the promoting the notion of the diversified raw material used in plastic arts, and to how extent students of plastic art can benefit from using processed images via Photoshop software in their handiworks of art work. Finally, the study sought to improve the cultural, visual and social environment by recycling consumed wastes and raw materials. The most important results found in the study is that there is a need for encouraging students to positive innovation and creativity, to install collaboration and prosocial behaviors, and environment sustainability by disposing consumed wastes and transforming them to art works with high value.

Keywords: Visual Image, Digital Art, Consumed Wastes, Synthesis Art.

ÖZ

Bu çalışmanın amacı, Yarmouk Üniversitesi görsel sanatlar bölümü, güzel sanatlar fakültesinde sunulan el sanatlarında görsel imgenin üretilmesinde Photoshop yazılımının etkin kullanımını incelemektir. Çalışmanın bir diğer amacı, plastik sanatlarda kullanılan çeşitlendirilmiş hammadde kavramının geliştirilmesine katkıda bulunan ve sanat eseri yeniliklerinde tüketilen atıkların ve hammaddelerin geri dönüşümünün çeşitli kullanımlarını ve plastik sanat öğrencilerinin ne ölçüde faydalanabileceğini değerlendirmektir. İşlenmiş görüntülerin sanat eseri işlerinde Photoshop yazılımı aracılığıyla kullanılması. Son olarak çalışma, tüketilen atıkları ve hammaddeleri geri dönüştürerek kültürel, görsel ve sosyal çevreyi geliştirmeye çalışmıştır. Araştırmada elde edilen en önemli sonuçlar, öğrencileri olumlu inovasyon ve yaratıcılığa teşvik etmeye, tüketilen atıkları bertaraf ederek ve yüksek değerli sanat eserlerine dönüştürerek işbirliği ve toplum yanlısı davranışlar kurmaya ve çevre sürdürülebilirliğine ihtiyaç duyulduğudur.

Anahtar Kelimeler: Görsel İmge, Dijital Sanat, Tüketilen Atıklar, Sentez Sanatı.



1. Introduction

In every age, Art has not been separated from life and society. Artists have tried to add special aesthetic touches. In postmodern arts, artists have benefited from media, cultural changes, science developments, and practicing experiments as their production of aesthetic artworks has increased. After a period of isolation from society which caused a gap between them and society, their works of art have started becoming more social and closer to real life.

Artists used art to reflect human life reality and the nature of the environment to which they belong. for example, they used wastes and raw materials that have no value after consumption; such as cans, bottles, bags, paper, photographs, etc. to produce a beautiful artwork and which will become a center of attention and attraction of the artwork; An artist can generate from worthless and consumed things objects with another function that have nothing to do with their original function, and can give it new meanings expressed in absolute freedom without restrictions.

1.1. Study Problem

The problem of the current study relies in employing photoshop in producing art works from raw materials and consumed wastes, and applying it practically in artistic works of multiple methods, because of the presence of a lot of waste and raw materials of plastic, metal, glass, paper and other wastes in a way lacks aesthetic, ethical and social aspects, causing many Environmental, health and economic damages. Thus, the present study sought to answer the following key question: What is the efficiency of using Photoshop software in reproducing the visual image of consumed wastes and transforming them to art works with high value by plastic art students?

1.2. Study Significance

The importance of the study is to motivate students to positive innovation, creativity and productivity to install collaboration and prosocial behaviors, and environment sustainability by disposing consumed wastes and transforming them to art works with high value. added to that, educating the individuals by developing their manual, technical and technological skills, introducing students to the relationship between experimentation with



creativity and getting them to a distinctive style in producing artistic works through recycling raw materials and wastes.

1.3. Study Purposes

The current study sought to achieve the following purposes:

1. activating the use of "photoshop" software in reproducing the visual image in the handicrafts.
2. having benefit from recycling raw materials and consumed wastes in innovating artistic works contribute in activating the vision of the raw materials multiplicity used in plastic arts.
3. Benefiting Students of plastic arts from using processed images via "Photoshop" software in their handiworks production of art works.
4. Improving the cultural, visual and social environment through recycling the raw materials and consumed wastes.

1.4. Study Limitations

This study has involved the following limits:

- Human Limitations: Sample of plastic arts student's department of, course of handicrafts.
- Procedural Limitations: The formation of artistic paintings via Photoshop technique to recycle raw materials and consumed wastes, and the integration of Digital art and Assemblage Art.
- Spatial Limitations: Yarmouk University, Faculty of Fine Arts, Department of Plastic Arts.
- Time Limitations: The first semester of 2016-2017 academic year.

1.5. Methods

The present study has adopted a qualitative approach. Through being interested in opinions, views, human experiences, this approach provides subjective rather than objective data. Data and information were collected in the qualitative approach through direct interaction with students and groups, and through individual or group interviews or observations. Thought, the nature of data and information collection in the qualitative



curriculum and the long time it takes requires the use of small samples. In qualitative method, different techniques are used when selecting samples; the sample seeks information from specific groups, or subgroups of the study population.

1.6. Previous Studies

Fadali (1991) conducted a study aimed at identifying the most important through which expression and experimentation are practiced on the surface of the plastic image. It also aimed to design a program in which the student searches for various plastic solutions in new configurations by practicing the experience of synthesizing raw materials on the surface of the image. The researcher followed the analytical and experimental approach in her study. The results showed the importance of having, at the Faculty of Artistic Education, basics and controls through which the experience of synthesizing raw materials is practiced on the surface of the image. She explained that it was possible through the program to contribute to the development of college student's personality by enriching his/her experience with experimentation concept by raw materials, and synthesizing it with each other on the surface of the image.

Nasser (2008) also carried out a study aimed to detect the most important features and concepts of Pop Art, and the associated plastic and expressive values on the surface of the plastic painting. The researcher developed reassembly works based on the aesthetic features and concepts associated with Pop Art. She adopted the descriptive and analytical approaches. The results showed the variety and diversity of patterns, performance styles and technical methods of expressing, by different medias, a clear feature of Pop Art. Reflecting its concepts derived from the arts of modernity and post-modernity, pop artists used different medias and various raw materials to express many aspects and issues of society and everyday life. Thus, Pop Art has emerged emphasizing the importance of the content and aesthetic function of raw materials. So that, to explore new and unorthodox methods, most pop artists have renounced traditional techniques. Al-Nasir's study agrees with the current study on the importance of employing consumed raw materials in producing artworks. She also benefits, from this study, from recycling fields of different raw materials.

Asker and Hasan (2011) has conducted a study aimed to identify (Photoshop) software impact on the development of designing instructional aids skill (publications) in educational



techniques course for second stage students / Art Education Department / Elementary Education College / Diyala University for 2009/2010 academic year. To achieve the study purposes, the researcher adopted the experimental approach in designing the two (control - experimental) groups, which has pre-post tests. The results revealed that the effect of using "Photoshop" software on skillful performance in instructional aids designing is greater than the effect of the usual method used in teaching educational techniques. Asker's study is consistent with the current study in its importance and achieving some of study purposes.

2. Literature Review

2.1. Assemblage Art

Assemblage art emerged in the twentieth century as a style of postmodern arts. It is one of the arts that are based on combining more than one raw material, whether they were natural or industrial, and synthesizing them on the surface of painting using more than one style and technique differently to create real plastic dimensions of the image (Crowther, 2018). Its emergence was in parallel with "Dada". To form a painting based on the intellectual notion, the processes of combining and composing raw materials varied more than aesthetic concept. Assemblage art was not a trend or a school per se, such as other schools (realism, surrealism or etc.) (Nasser, 2008).

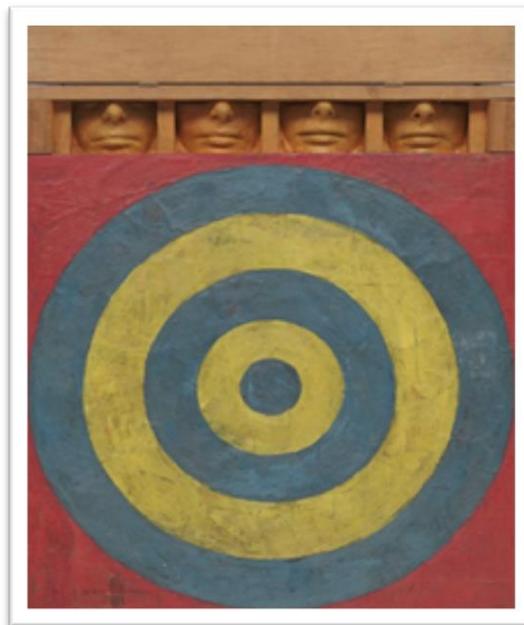


Fig. 1: Target with Four Faces, Jasper Jones (1955)



The pop artist "Jasper Jones" is considered one of the most important artists who introduced the notion of Assemblage art in their artworks, where he presented a lot of Assemblage artworks. His "Target with Four Faces" in 1955 is the most important one, in which he expressed a social content related to the relationship between human and world events. In his work, he used "target shooting " game with a group of human faces (as in Fig. 1) (Bogousslavsky and Tatu, 2018). According to (Smith, 1995), Jasper Jones was also interested in consumed and neglected materials founded in our life; such as ordinary objects, bottles, flags, brooms, etc.), He focused on the artistic effect in his works rather than painting the images only.

Another famous artist is "Robert Rushenberg". In many of his works, he placed many objects and various materials on an oily surface, such as newspapers, needles, fabrics, bags and sheets. He also was using photographs and Coller Art on large spaces, where his artworks were full of daily life's materials (Al Wadi, and Khadir, 2011). Robert Rushenberg is one of the artists who established (Art and Technology Experiences) movement. It was aimed to combine engineer, artist and architect potentials in an attempt to bridge the gap between art and life. For example, Robert Rushenberg's "Landing Jump" in 1960, (Fig 2) (Oechsli, 2005).



Fig. 2: Robert Rushenberg's "Landing Jump" (1960).



2.2. Technology in assembly and synthesis:

Today, the world has witnessed rapid developments in all aspects of life, as the technological revolution in modern age had an impact on the artistic creativity medias, whether in terms of objects or raw materials, techniques and multimedia; such as computers, televisions, videos and others. In the post-modern arts, artists started abandoning the adherence to traditional media rules in terms of artistic expression. To be distinguished from other artists, an artist was trying to add his/her special aesthetic touches in their works. Furthermore, artists benefited from technological developments and its techniques by employing them to produce digital and manual artworks using different styles, such as; Digital Art, assembling digital art after being employed in Handicraft art, style of Assemblage combining between Coller art and Assembly Art, as well as synthesizing raw materials and consumed wastes in such artistic works (as in Fig. 1 that combines Coller, Digital and handicraft arts) (Elena and Popkova, 2019).

In his painting "Revival", presented in the "Exceptional Art" show at "The Venue" hall in Beirut, the Lebanese artist "Rafi Yadian" also recycled raw materials and consumed wastes. It was a face of a metal mesh and named "Revival" to indicate that he produced a work of art from materials were supposed to have no need, such as, such as iron and tinplate in general and materials that come out of the lathing machines, in addition to materials he was throwing out in his usual work (Al-Hattab, 2010). In general, artists used a variety of materials in their artworks like, textiles, metal and wood, aluminum bottles, plastic bottles, glass bottles, bags, newspapers and other assemblage materials, turning it into antiques and eco-friendly artworks (Hill, 2010).

Computer drawing has become a strong competitor to handicraft drawing in terms of the feature's accuracy, clarity and variety of color temperature, and the possibilities of its overlapping (Davies, 2012). In addition to that, digital drawing surpasses handicraft drawing in its speediness, and easiness to change lines, colors and configurations (shapes). As well as, digital drawing became able to give the third dimension, which has had a profound effect on the visual image that has become visible on a screen, or printed on paper (Madoff, 1997).



3. Analysis Framework

The present study relied on interview, application, observation, and finally analysis of documents collected after conducting experiments, as follows:

First Phase: selecting a sample of students to carry out practical experiments, where a sample of (12) students were selected at different technical levels. The sample were female students because all the enrolled in the course were female.

Second Phase: Practical experiments, which consist of three “experiments” projects, were initiated through lectures at specific times. After completing each project, the next one was initiated, as follows:

The First workshop: "Visual Plastic" Roses": The topic of the artwork was "Visual Plastic (Roses)". The digital work was produced via Photoshop software. Artwork size (70 * 50) cm. To recycle the raw materials and consumed wastes manually, the digital artwork was printed after completion, and then distributed to sample students.

The Second workshop: "Parts of Jordanian Heritage": Artwork's topic was "Parts of Jordanian Heritage" The digital work was produced via Photoshop software. Artwork size (70 * 50) cm. To recycle the raw materials and consumed wastes manually, the digital artwork was printed after completion, and then distributed to sample students.

The Third workshop: "Applying various digital drawings and designs on Pringles cans": Artwork's topic was "Applying various digital drawings and designs on Pringles cans", such as recycling metal and glass bottles using the same mechanism as in the two previous experiments.



Fig. 3: Visual Plastic "Roses"

3.1. First Experiment Procedures:

At the beginning, the researchers brought raw materials to be recycled (and put them on the table and explained the work mechanism), in order to add them to the digital painting, a bouquet of Roses designed and formed as in "Fig. 3", printed and implemented via Photoshop software. Then, adding effects, as well as, merging images with each other via Photoshop. And finale, conducting an artistic painting by forming raw materials and consumed waste together (Assemblage Art) (Fig. 4).



Fig. 4: raw materials to be recycled "Visual Plastic" "Roses"



After distributing the digital works to the students, where each student was setting next to a special table for helping her to achieve the artwork. Added to that, giving them notes and instructions by researchers and answering any of their inquiries. Notes about students and their impressions were recorded. According to her artistic taste, each student carried out the recycling process of the available raw materials and consumed wastes. Students were excited during the experiment. experience was stimulating for students' creativity and positive productivity. The importance of this experience and its relationship with creativity lies in; transforming these materials into artistic works of aesthetics value; educating individuals through developing their manual, technical and technological skills; helping students to adopt a distinctive style of producing artwork by recycling raw materials and consumed wastes; and revealing the unorthodox creative sense of combining digital art with handicraft.

After conducting the experiment, it was found that:

In addition to students' enthusiasm to achieve an artistic works accurately and motivate them to innovate, creativity and positive productivity, as well as introducing them to the relationship between experimentation and creativity. It is possible to produce artistic paintings (manual digital) through recycling raw materials and consumed wastes in a beautiful and creative style.

Table. 1

Students No.	12
Experiment Topic	visual Plastic "Roses" presented in recycling raw materials and consumed wastes / printing the artwork implemented by "Photoshop" software and handiwork recycling by raw materials ...etc.
Used Raw Materials	Digital work / roses and its plastic and consumed leaves / paper / eggs box / buttons / tissues / saws / plastic mugs and boxes / taps / colors / glue / wood/ tree leaves / tiny cypress seeds / beads / car wheels / drawing brush / carton / putty.



Experiment Purpose	combining digital art with handicraft, producing artworks by recycling raw materials and consumed wastes and making them useful, illustrating the importance of combining digital art and handicraft, and to keep up with technology.
Place and Time	Fine Arts' hanger, Yarmouk University, 2016

To produce an artwork, researchers conducted the second experiment "Parts of the Jordanian Heritage", a formation of artistic painting through recycling raw materials and consumed wastes, such as; embroidered dresses and some ancient tools like keys and other antiques. This topic has been chosen for the importance Jordanian heritage in terms of customs and traditions, and the importance of preserving them, in addition to enhancing patriotism, (as in Fig. 5).



Fig. 5: The second experiment " Parts of the Jordanian Heritage".

3.2. Second Experiment Procedures:

At the beginning, researchers used Photoshop software to produce a digital work by collecting images and embroideries of Jordanian heritage. Then, they added effects and made amendments by adding or deleting some parts. After that, the digital work had been printed. When the experiment began, raw materials and waste used for the experiment (including



embroidered dresses, buttons, keys, etc. as shown in Table 2) had been added. Later, the work (50 * 70 cm) had been distributed to students to start the experiment. Each student carried out her handicraft work on the printed digital work through recycling the available raw materials and wastes. they formed their paintings according to their artistic taste and creative sense (as in Fig. 6). Researchers explained to students the experiment's and its execution mechanism. As noticed in this experiment, students' enthusiasm has increased during the work as well as their passion to see the results. They were drawing without boredom and their response to the experiment and applications was wonderful. At the end, the results were beautiful and impressive. Probably, this experiment showed students creativity; because combining both, digital and handicraft art "Mixed media", is a difficult field which needs special artistic ability, patience and effort as well.



Fig. 6: A student's experiment, "2nd Experiment"

In the second experiment, there was a creative and beautiful painting (Mixed media) made by a student, which increased students' enthusiasm to implement the works of art accurately, and increased their motivation for innovation, creativity and positive productivity. It was a good experience which introduced them to the relationship of experimentation with creativity, and allowed them to produce useful art works using recycled raw materials and wastes, see Table 2. Researchers also conducted the third experiment "Applying various



digital drawings and designs on Pringles and other cans", through recycling various kinds of cans via Photoshop software, then employing them on consumed and empty cans, in order to take advantage of them after being consumed.

Table 2

Students No.	12
Experiment Topic	"Parts of Jordanian Heritage" presented in recycling raw materials and consumed wastes / printing the digital work implemented by "Photoshop" software, and recycling raw materials through handiwork ...etc.
Used Raw Materials	Digital work / buttons / colors / glue / clothes with drawings of roses / tiny cypress seeds / wool / drawing brush / carton / pearl beads / burlap sacks / small artificial roses / ancient keys / diverse accessories (bracelets, necklaces...etc.).
Experiment Purpose	combining digital art with handicraft, producing artworks by recycling raw materials and consumed wastes and making them useful, illustrating the importance of combining digital art and handicraft, and to keep up with technology.
Place and Time	Fine Arts' hanger, Yarmouk University, 2/11/2016

3.3. Third Experiment Procedures:

In this experiment, researchers designed, drawn and assembled images with a variety of subjects via Photoshop software, such as: bringing pictures of cartoons, monuments or others which can be found on the Internet. After that, they inserted them into Photoshop, and modified them. Next, they printed them as stickers to be stuck on the cans. Those stickers were (A4 (21 x 29.7 cm) and 50 * 70). In addition to that, students added beads, wool, glossy materials, colors, etc. according to their personal artistic taste. To have a preliminary idea of



the experiment, researchers made video as a sample on how to do and apply the experiment, (as in Fig 7). And then, they sent it via WhatsApp to the sample students.

On 23-11-2016, researchers gave students the stickers, cans, colors, wool and other materials (as in Table 3), in order to apply the experiment. And then, each student recycled the cans and stuck the printed pictures and other materials, each one did that according to her artistic taste (as in Fig.8). The final results were beautiful recycled cans, which can be used as a decoration or aesthetic scene. For example, it can be used as a pan, a bucket for plants or roses, or others.



Fig. 7: Researchers' experiment on a pringles cans

Third experiment's results represented in producing beautiful, useful and creative artworks by recycling consumed cans, in which students reflected their creativity. Experiment topic motivated them for positive productivity, and introduced them more to the relationship of experimentation and creativity. Added to that. it helped students to use a distinctive technique in producing artworks through recycling raw materials and consumed wastes.



Fig. 8: Students' third experiments on consumed cans.

Table 3

Students No.	12
Experiment Topic	"Applying various digital drawings and designs on Pringles cans" presented in recycling raw materials and consumed wastes / printing the digital work implemented by "Photoshop" software, and recycling raw materials through handiwork ...etc.
Used Raw Materials	Digital work / buttons / colors / glue / clothes with drawings of roses / tiny cypress seeds / colorful beads / wool / drawing brush / carton / pearl beads / burlap sacks / small artificial roses / glossy materials / torn clothes / taps...etc.)
Experiment Purpose	combining digital art with handicraft, producing artworks by recycling raw materials and consumed wastes and making them useful, illustrating the importance of combining digital art and handicraft, and to keep up with technology.
Place and Time	Fine Arts' hanger, Yarmouk University, 23/11/2016



4. Results and Recommendations:

4.1. Conclusion:

1. Encouraging students to positive innovation and creativity, to install collaboration and prosocial behaviors, and environment sustainability by disposing consumed wastes and transforming them to art works with high value.
2. Benefiting from recycling raw materials and consumed wastes in order to invent artworks contribut in promoting the vision of raw materials variety used in plastic arts.
3. Improving the cultural, visual and social environment by recycling and raw materials consumed wastes.
4. Combining between digital art and handicraft does not mean abolishing handicraft and paintings, it means to keep up with technology and modernity, where the diversity of following artistic styles for producing beautiful artworks innovatively.

4.2. Discussion:

Photoshop software provided a paradigm shift for digital and plastic art. It allowed artists to choose the elements which will be used in their paintings, as well as selecting a myriad of colors and effect, and merging them with each other easily, in addition to the artwork's high accuracy and the amend any part of them. Added to that, the ability to use the suitable fonts, and to complete the artwork in a short time. After that, the digital work can be merged with the handiwork and vice versa. Via photoshop, an artist can use and implement photographs in his digital work, as well as adding and deleting any part of them. creative artists can employ Photoshop in their handicraft and vice versa. So that, digital art and handicraft support each other, neither can replace the other because each is an art in itself.

Among the many uses of the Photoshop, adding amendments and effects on images, videos and paintings. Images can be processed in terms of adjusting and changing their colors, brightness and others. Like the researchers, one can also merge and design images. Via Photoshop, it is possible to make paintings and images as cartoons. Therefore, Photoshop also uses in animation and paintings, where it is moving still images to has many uses, and can be use in various disciplines.

Via Photoshop, digital art can be used with handicraft art to produce creative artworks by recycling raw materials and consumed wastes. So, it has many benefits such as; protecting



the environment and natural resources, reducing wastes amount, which resulted in reducing the environmental pollution creating new job opportunities. Recycling can be used in turning raw materials and consumed wastes to useful and valuable products, such as the present artworks made by researchers and students, which revealed their creativity and enhanced their self-confidence. Recycling can benefit the environment and community by minimizing the amount of wastes thrown out. Moreover, those wastes can be turned into forms and works of art that serve the environment, and give it a beautiful and distinctive view. Thereby serving the community by reducing wastes amount.

Recycling has revealed student's creativity and encouraged them to convert raw materials and consumed wastes into useful and beautiful artistic products, that has an economical and aesthetic value on the environment, which reduces the impact of these wastes and waste on the environment.

4.3. Recommendations:

In light of the researchers' findings, this study recommends the following:

1. Introducing digital programs in bachelor and Fine Art spatialization, and merging it with handicrafts in some courses.
2. Involving "Photoshop" software in some plastic art's courses to merge both, digital art with and handicraft. Thus, distinctive artworks can be produced.
3. Organizing exhibitions in Plastic Arts Department include artworks of raw materials and consumed wastes through combining digital art and handicraft and revealing students' creation.



References

- Al Wadi, Ali, and Khadir, R. (2011). Marginalization in the postmodern art. Amman: Jordan, Dar Safaa, Dar Al-Sadiq.
- Al-Hattab, Kassem, 2010. "Aesthetics of Plastic Art in the European Renaissance and Modern and Contemporary Art Schools. Dar Alnahda
- Asker, N and Hassan, A. (1994). Effect of Photoshop in developing the skill of teaching aids design (publications). Al-Adab Journal. Baghdad University 96. Pp. 607-634
- Davies. A. (2012). Computer-aided Drawing and Design. Springer Science & Business Media
- Bogousslavsky, J and Tatu, L. (2018). Neurological Disorders in Famous Artists. Karger Medical and Scientific Publishers
- Elena and Popkova. (2019). The 21st Century from the Positions of Modern Science: Intellectual, Digital and Innovative Aspects. Springer Nature
- Fadali, F, (1991). Synthesis of materials on the surface of the image in the field of photography. Contemporary, Unpublished Master Thesis, Faculty of Art Education, Helwan University, Cairo.
- Hill, D. (2010). About Face: The Secrets of Emotionally Effective Advertising. London: Kogan Page.
- Crowther, P. (2018). Geneses of Postmodern Art: Technology as Iconology. Routledge Advances in Art and Visual Studies. Routledge.
- Madoff, S. (1997). Pop Art: A Critical History. Berkeley and Los Angeles: University of California Press,.
- Nasser, Zahra. (2008). Pop as an introduction to the creation of synthesis of plastic painting. Unpublished Master Thesis, College of Art Education, King Saud University, Saudi Arabia.



Oechsli, Matt. (2005) *The Art of Selling to the Affluent: How to Attract, Service, and Retain Wealthy Customers and Clients for Life*. Hoboken, N.J.: Wiley.

Smith, E. (1995) "Artistic Movements after World War II", translated in Arabic: Fakhri Khalil. Dar Almamoun Bagdad.

Figure references:

1- Figure No. 1, *Archery with Four Faces*, 1955, Jasper Jones, available at (<https://www.moma.org/collection/works/78393>), accessed on 2/12/2017.

2- Figure No. 2, *The Leaping Jump*, Robert Ruchtberg, 1961, available at (<https://www.moma.org/collection/works/81468?locale=en>), accessed on 2/12/2017

3- Figures No. (3., 4, 5, 6, 7 and 8), a special photograph by the researchers