The effect of using modern technology on graphic designers' skills in Jordan Arts in the shadow of cultural and political transformations and technology

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Abstract

The current study aims to identify the effect of using modern technology on graphic designers' skills in Jordan. This study used the descriptive approach; a questionnaire was used to collect data, which included two domains: the first: the degree of using modern technology and the second: the effect of using modern technology on graphic design skills. The study sample consisted of (150) male and female graphic designers in Jordan. The results showed that the level of using modern technology among graphic designers in Jordan was high, and the effect of using modern technology on graphic design skills in Jordan was also high. The results also indicated that there were statistically significant differences due to the age variable in favor of "25 years and less", and there were statistically significant differences due to gender variable in favor of male graphic designers. The researchers recommended that it is important to encourage graphic designers to keep up with the latest developmentsand updates in the field of graphic design through communication technology.

Introduction

Modern technology of all kinds constitutes a qualitative leap in the life of mankind, and it is necessary to catch up with this development and preparation in harmony with these advances, so the need has emerged to use modern technology in developing and strengthening capabilities and skills and expanding them to a high level of intellectual and scientific knowledge, and enriching them in

performance and the way to deal with these developments, since the availability of these developments leads to easier communication, access to information, and improving work and skills (Afif, 2016).Technological development has resulted in providing many advantages in the field of graphic design, in turn, was reflected in the interest of graphic designers by directing their energies and stimulating them to creativity in many various and different ways than they used before modern technological development, which gave the graphic designer the techniques that added new values and has affected positively the development and preparation of the design movement, whether traditional or digital, and information technology, multimedia, optical technologies and modern means of communication of modern technology that helped in the development and prosperity of graphic design, therefore, to the improvement of the final creative product, which has revolutionized the actual modern artistic design, which includes illustrations, animations, and high-quality images that helped to create new ideas (Assal, 2010).Skill is considered as one of the performance techniques in the graphic design profession that may increase the expertise of designers at all levels, such as the self-level, as the skill helps to describe, analyze, and interpret behavioral interactions resulting from human activities, as its holistic composition constitutes a field for achieving the experience that the designer acquires and upgrading the systems of intellectual, aesthetic, and creative experience, communities systems, which helps the community to accept the designer's technical product, and focus on customers' requirements, and have the ability to listen and communicate well with the environment (Al-Zuhlaf, 2017).In 2015, Jordan was ranked 52th out of 139 countries in the Internet Readiness Index, Skills and using across the country. Jordan has succeeded in establishing and developing a highly competitive communications and information technology sector to become one of the most advanced and powerful in the region, and strengthened this sector through 15 years of friendly industrial policies and among the educated youth groups with increasing numbers of digital consumers, the communications and information technology sector is considered the main economic contributor, recording dramatic annual growth rates since 2000, and besides, mobile phone and internet uses have increased with a high prevalence (Jordan Investment Commission, 2015).The researchers consider that it is necessary to highlightmore on the technological development and the impact of its use by designers in Jordan in conjunction with the growth of modern technological innovations on the one hand and the requirements of the industrial and commercial community and the needs of art to keep up with the rapid and progressive development of the modern age.

Problem of study
Modern technology has dominated our modern contemporary world and it has become necessary to reconsider and reflect on its effects, and graphic design is greatly affected because of this rapid development, which is reaped in technology and information revolution at the same time, graphic design is considered as the most important technical used in today's world, as the need for studying the impact of this technology on developing the skills of the Jordanian graphic designer of the need to promote and keep up with the progressive Era with all its creations and innovations to upgrade design and productive concept throughout activation the role of positive technology on design skills.

Study questions
This study seeks to answer the following questions:

1-   What is the level of use of modern technology for graphic designers in Jordan?
2-   What is the effect of using modern technology on graphic design skills in Jordan?
3-   Are there statistically significant differences in the level of use modern technology and its effects on graphic design skills for designers in Jordan due to variables (gender, age, and educational qualification)?

Objectives of the study
The current study aims to identify the impact of using modern technology means on graphic design skills in Jordan, and to identify the existence of statically significant differences in the level of using modern technology and its impact on graphic design skills for designers in Jordan due to variables (gender, age, and educational qualification).

The Significance of the Study
The importance of the study has emerged based on the highlight of the recent technological development that pervaded in the world in the last decades of the 20th century and its impact on skills acquisition related to graphic design for designers in Jordan and the impact of modern technology in developing creative and innovative skills for designers to keep up with the requirements of the times, and to increase the designer's awareness of the importance of modern technology and its use in the field of graphic design in order to reach to double production and improve performance; at a time that requires the designer to be creative and innovative in their designs conversant with this technology that helps them to create designs that keep up with updated developments, enriching of the conceptual framework and provide researchers with it in order to open new horizons for similar studies due to the lack of previous studies on the current study variables.

Terminological and procedural definitions of the study
•   **Modern technology**: It is the technology that appeared in modern times, especially after the industrial and information revolution, where it has gained a prominent place in the field of production, which is the science of the arts, professions and material properties (Afif, 2016). It is procedurally known as the technology that has emerged in modern times in Jordan and includes the Internet and related information and communication technology and multimedia that have affected the development of skills in graphic design.
•   **Graphic design**: It is a widespread specialization of knowledge branches, means visual creativity, and includes several aspects such as art direction, design of typefaces, page layout and its design, and other creative aspects. The design deals with ideas, concepts, text, and images and presents them in a homogeneous visual form, through printing, electronic media and any other means (Al-Qur'an, 2015). It can be operationally defined as the art through which ideas are turned into something visible, audible or written by employing the skills that the designer acquires from modern technology in order to reach specific goals, his information

and communicating with what are new, using design elements to create a unique work of art.

Limitations of the study
▪   Human limits: This study was applied only to graphic designers.
▪   Spatial limits: The study was applied only to graphic designers in Jordan.
▪   Time limits: The study was applied during the year 2018.

Conceptual framework

Graphic design
The emergence of graphic design extends and linked throughout the history of mankind in a human attempt to organize his information and ideas, and to create a culture of expression and a sense of artistic facts that document his experience, and through time, a series of successive developments appeared expressing of human feeling, and then features of art emerged through the drawings in which the primitive man expressed his personality and daily life, it was carrying a symbolic representation of the events that the human was carrying for during those periods, and there were several leaps at that time that led to the beginning of speech by humans which, in turn, helped the emergence of writing that was in the form of pictorial diagnostic graphics that developed into visual symbols (Yazji, 2012). Graphic design is a technical and professional knowledge system that concentrating on visual communications and presentations in order to achieve the goal of delivering a message or creating a product (Najmuddin, 2016, 198). Design expresses the approach, through which specific ideas are proposed using visuals, and this process is similar to interpreting the person's internal feelings through the use of elements and foundations design, and in the general, graphic art it is the art of cutting, engraving or processing the material with the aim of achieving typographical surfaces and obtaining Various visual artistic effects by printing them. It is the art of printing, and printing replicas, the artist performs all his stages of design work, preparing typographical surfaces, engraving and printing them (Al-Dressa, 2008). Moussa (2011) defines it as an innovative approach performed by a designer or group of designers upon request of the client and collaborates in the implementation of its material data a group of producers (printers, programmers, directors, etc.) in order to deliver a specific message (or a group of messages) to the target audience. The graphic design is based on the following main elements:

1.   **Typography**: It is the employment of relationships among words, images and the special visual effects generated in design, and it's considered a way to get an expressive artwork by manipulating letters and words and testing the formats that affect the receiver and stir up his emotions, and, by typography, the designer can include various readings such as advertisements, booklets, flyers, wrapping, book covers and logos (Al-Qassas, 2009). Modern typography is classified into the Influential Typography, and it is in the form of a dramatic story that the designer seeks to deliver by forming letters and its merging them and using images, and Three-Dimensional Typography, in which the designer uses three-dimensional design programs to make the text appear as anthropomorphic, gives it a real character, and adds a feel to it. In addition to the kinetic typography, which

consists of animated effects of texts in the form of video displayed on an electronic environment to deliver a specific message and may be in a repetitive style (Houria, 2018).

2.   **Illustration**: Illustrations constitute artwork that explains, concludes, and beautifies, whether illustrations are handwritten or digital means, as they take many forms. And even convey the impression that the reality of photography cannot provide us with (Al-Rawi, 2011). Animation has been used in the twentieth century with technological development in several areas, including entertainment, advertising, advice, art, advertising, and movies, which reflected an impact on graphic design. There are two types of animation that the technology has enabled to use across multimedia, which is two-dimensional animation, and it is more common that flat images manually are being drawn shot by shot, and the ones used by large animation production organizations till now, and three-dimensional animation, which is creating a 3D mathematical model that reflects the object's shape and dimensions. The software and physical components affect the formation of types of graphics, the appearance of animation, and the way to animate them (Al-Arabi, 2005).

3.   **Image**: The image works to add various expressive values, overlapping all the graphic vocabulary that affects the part-to-whole relationship side by side with part-to-part-relationship within the artwork. The image may obviate need of the extensive use of other design elements, whereas the aesthetic aspect of design mainly depends on achieving the visual perspective for the recipient and its relation to the idea, and having artistic and aesthetic values to achieve attraction and interest, and its main function is to make the task easier, understanding the idea, and transferring information (Qurei, 2010).

Both of image and text represent the two main pillars of the design and their arrangement on the page, screen, or built environment is one of the ways people communicate with the modern world. A designer makes a greater effort at different levels to communicate more effectively, that requires the various design elements to complement each other to improve the overall communication, that designers are trying to make the world meaningful by arranging those elements and presenting them as required. Since the goal is built using text and image to create meaning, which can be accomplished by using symbols, metaphors, or any other tools (Al-Qur'an, 2015). The line element is existed in every design, as lines are used to draw borders between design departments, create blanks, or even creates movement. Shape or design is embodied by a set of lines that takes a shape as geometric shapes and abstract shapes, the second most commonly used element, as it was not the most important among the elements in the design process is the color because it gives the strongest visual impact. As the colors clearly affect the receiver that they have powerful Sensory connotations arouse different emotions and feelings in the same scenes. Usually a certain color is used for a certain subject depending on the knowledge of colors and their psychology, and the color is given its value in the design throughout the light level by inserting the appropriate optical ratio such as shadow and light to convey the design idea by including the third dimension in it (Al-Bakry, 2018). Design basis are what implies the existence of an identifiable perception in which all the elements and the balance that determines the sizes and shapes in design, separating them as a vertical or horizontal imaginary line with rhythm which is the common element

among audio-visual arts along the movement, The existence of a blank that suggests the imaginary third dimension that the designer creates, and the fulcrum that serves as the key to the design which becomes as the point which the viewer focus on it in the visual center is the most attractive, as all of these foundations are what the designer depends on building the successful and expressive design of the advertising message (Al-Arabi, 2005). And a graphic designer should have set of skills and elements that make him able to perform design profession professionally, like being able to create and innovate, as graphic design depends on a new creative idea far from tradition. In addition to have the necessary knowledge in things such as schools, styles, and art directions as a basis of working in design, besides to rules, bases and art production, so he can arrange design element in a successful, functional, attractive and artistic shape. Also being in knowledge by the whole stages of design and final and a graphic designer should have set of skills and elements that makes him able to perform design profession professionally, like being able to create and innovate, as graphic design depends on a new creative idea far from tradition. In addition to have the necessary knowledge in things such as schools, styles, and art directions as a basis of working in design, besides to rules, bases and art production, so he can arrange design element in a successful, functional, attractive and artistic shape. Also being in knowledge by the whole stages of design and final finishes, having design, planning, implementation and art direction skills as well. And his ability to search, see, observe, analyse and criticize, in addition to the applied experiment and practice. Designer also has to be familiar with all new and the development of technical process related to design in general and particular with regard to software and recent versions. The designer contact with others and colleagues and to be familiar with their latest experiences and creative work by contacting and communicating with the environment, and learning from others' designs and taking advantage of it whenever possible from broadening of his knowledge and experiences, which inevitably reflects his thinking and creativity (Al-Zuhalaf, 2017).

Modern technology
Modern technology has led to great developments in the forms of painting, sculpture, photography, and its techniques, and in arts in general. Different and innovative images have emerged throughout the recent versions software and it has become possible to draw pictures, send, sell, and buy them via the Internet. The arts related to animation have evolved and specialization software has become one of the main parts in institutes and academies, Artwork has appeared in the international exhibitions as an event that shows the extent of duplication between science and art unprecedented in the history. Composite Arts also appeared and the galleries and museums display those three-dimensional composite works (Jum`a, 2015). Technology is an independent science that has its origins, goals and theories. It is an applied science by its nature that seeks to integrate knowledge and the inputs and outputs aim to reach to solve problems concerning society. Since it's a systemic dynamic process that creates an active interaction among its components, and the technology used by the designer works on developing an innovative thinking in studying and analyzing problems and thus the possibility of producing new material using new inputs. Besides, the ability of technology to represent modern methods that can keep up with low-

costs, with the least time and effort possible. Therefore, this reflects the Increasing of self-confidence of the designers, especially when adding aesthetic and functional value to the design, which in turn reflects on the skillful performance of the designer (Al-Damah, 2009). Technology and modern technical means were provided to the graphic designer through the available programs in the art of design and many processors that help the graphic designer making a masterful artwork (Shehada K 2017). Technology has made available flexible skills and abilities within the work environment, that it performs several specialized tasks at the same time. So, digital technology, with its sophisticated capabilities matched with the actual process of design of ideas that a designer creates and uses to perform a specific job that achieves its purpose by collecting elements and foundations and establishing relationships between components to achieve the form language in design according to the designer's artistic vision. And then, this vision is transformed into applications after implementation with Special programming, as the use of programs is necessary in the design process in what actually requires the complex nature of the design problem itself, and its need to process   a tremendous amount of information, alternatives, modification, continuous development and the accuracy of performance, also the design's need to a quick respond according to changes in the marketplace and keep up with other input factors has made the use of software an important and inevitable in the field of design (Shafiq, 2009).

Inevitably, what most directs the designer in the graphic design is creativity, and technological development has put designers at the heart of this creativity process so that the designer through his creativity can coordinate action among other disciplines, and whereas the responsibilities of the designer now include dealing with multiple actors at the same time (Al-Qur'an, 2017). The technology and its techniques have been able to develop the creative capabilities for the designer, as the techniques provide the designer with the alphabets of design, which makes them superior to other traditional design tools. Also allowed the designer to deal with the shapes through the various technical programs by repetition, removing and addition. Furthermore, possibility of direct interaction on screen surface, and it allows the feature to change the places of shapes and sizes easily and very quickly (Saqur, 2009). As the virtual environment also provides a technical reality with many features that give the designer the ability to interact, participate and contact which in turn allows the possibility of employing an attractive environment in design, and enables the user to integrate into the virtual environment with his ability to visualize any structural system and how to employ the design elements inside it, which led to increase effective percentage in design (Hassan, 2011). Won (2001) pointed out that modern computers have helped providing immediate graduation with more details and tangible results, while traditional methods such as paper use can be used in design which help designers creating more solutions and at the same time, designers that use paper, their graphic designs are based on more solutions than those which use software, since, material drawing allows designers to rethink their interpretations, while Erdurak (2002) saw that the creative process in design involves various aspects such as visual consciousness, exchange of ideas, patterns of culture and pilot projects. And creativity is a ability that a designer may be able to develop by practice, experiment, application and understanding of design principles and elements that

a designer may obtain by using modern technology. The transition in design art in the interests of achieving new dimensions in vision and reception caused by the communications revolution by computer and man. And this transition is considered the most important source of viewing the image in the modern Era, because it is one of the most important dimensions of knowledge that entered the world of the image, so it changed the graphic system to a new system that relied on lasers beams in an attempt to create a more positive role for the 3D image model. The designer recreated the characteristics of circulation with visual effects embodying reality and achieving industrial and cultural identity, as a true and irreplaceable response in contemporary communities (Abdul, 2014). As graphic is considered one of most prominent arts that contributed to change the culture of societies and affected the individual and peoples' lives, especially that all types of art today are related to communication and outreach including graphic art, since the goal is to deliver a message to a group of individuals, and that the success is measured by understanding the idea and being clear(Abd, 2014). The technological process that accompanied the industrial revolution has a role in preparing many inventions that have provided other sources such as photographic and cinematographic machines, slides projectors, films and animations...etc., since techniques embody technical skill, its function becomes clearer. Technology with its various modern technologies and electronic media has facilitated for its users to deal with information, processing, storing, broadcasting and organizing it in more flexible databases. Besides, facilitating storage, archiving and restoring operations, that shortens and reduces the amount of documents and saves effort, time and money at the same time. And processing the problem of space with explosion of on-line information and images given of all places via satellites (Qasaa, 2009). This development has led to the emergence of the creative rebellion era in handling designers. In modern times, attention has been focused on the expressive rebellious image and tendency towards all that is modern and strange. So the designer took the slope of the love of the style of rebellion due to the change, diversity, and substitution of constants and ideas. The designer has become free from following the traditional and subtle classic-like creativity of her glow (Gom'a, 2015). Programs and techniques are considered the main principles that enable the designer to edit, improve and convert images to better and attractive shape. Software has provided various processors in its use for design with the possibility of applying them on a lot of works such as: photography, printed designs, images and graphics (Bigler, Stephens and Parker) e.g. Photoshop is one of the modern design programs that different international companies have produced, which characterized by high ability of processing images in HD (Gatter, 2006), as well as Illustrator, which characterized by flexibility and different effects in design, as being professional in such programs has qualified designers to acquire the needed skills in design at the entry level to more sophisticated and complex programs like After Effect, Cinema 4D, …etc. Since these programs are generally in continuous development through its updated versions to allow production of designs in different directions in a short time and to keep up with market needs, synchronized with the technologies development in the world today.

Previous studies

Researchers looked through a set of previous studies and the following gives provides: Al-Bakry (2018) has studied aiming to describe the effect of the virtual environment on learning graphic spatial/environmental design, aand thee experimental approach has been used through designing a three-dimensional virtual environment contributes to the integration of learners into the educational and design process. Study consisted of 21 students from post-graduate students specialized I graphic in Middle East University in Jordan, and divided into two groups, a control group studied environmental and graphical design elements in usual style, the other is an experimental group studied through employing thee virtual environment so that it would be a part of the educational add design process for the environmental and graphical design elements. And the pre- and post-test was applied on the two groups. The results showed that there were statistically significant differences for the two groups of graphic an interior designers who studied the virtual environment concept in the post test for the benefit of the experimental group. Al-Zuhlif study aimed to track the impact of the internet on graphic designers' skills in Jordan, which involved 300 Jordanian designers. The study has found that the internet tools is considered as a great educational environment which encourage the designers to learn and communicate effectively. In addition, the internet tools highly improve the graphic designers' efficiencies and skills. Hence, enable them to share and demonstrate their innovative and creative designs. Finally, Al-Zuhlif study recommended the necessities of in-depth research on the impact of the internet tools on graphic designers (Al-Zuhlif, 2017). And Abdel-Maksoud study (2014) is a study aimed at identifying the capabilities of modern digital media and highlighting the role of those applications and capabilities to raise the efficiency of design thought for the printed advertisement and achieving the main goal of the extent to which the success of the printed advertising design, The sample consisted of a group of newspaper advertisements, and the study found that stereotypical newspaper advertisements free of the innovative idea put the recipient in a state of mental apathy towards the subject of the advertisement. The development of the output form of printed newspaper ads and the development of production means are the quick and practical insurance for the superiority of other newspaper ads. Modern technology helps the designer to make new formations and discover attractive design dimensions, as it has an effect on the recipient and increases its imaginative and creative ability and reflects its capabilities in dealing with the vocabulary of that modern technology. The study recommended the necessity of issuing specialized periodicals and research to track successive developments in modern technology for the design and innovation of printed advertising. The Pan, Kuo, & Strobel study (2013) aimed to verify the designers' attitude and options toward using computers and graphics paper when participating in drawing during design, the study consisted of (65) students, and the questionnaire was used in this research, and the study found that drawing on computers, and that drawing and computer as design tools help students generating ideas at an early stage of design. Paper graphics help students to obtain a general idea and basic understanding of design while it consumes time and there is no immediate results can be provided, while drawing on computers allows students to work on more details. And the study of Al-Tayib (2011) aimed at identifying the effectiveness of multimedia in the production of Sudanese television programs by applying to the

graphic department in the period 2009-2011 in a sample of Arabic satellite channels. The observation, contrast and questionnaire were used as tools to collect information and data, and the study led to a set of results, the most important of which are the programs most commonly used in graphic, educational, news and political programs on Sudan TV. And that the design mechanisms represented in the technical and artistic quality of sound and image reflect the culture and civilization of the country, and that graphic represents the aesthetics of the screen. And the graphic technology has affected the viewer by reporting events directly and that expertise, specialization and practicing in graphics are the secret of creativity technically, and the employment of digital technology in transmission, developing the TV production, and keeping up with modern versions of design programs affect the type and unity of the design

Kokotovich & Purcell (2000) study aimed to examine design issues for creativity and mental synthesis. The experimental survey method was used on the study community, where two experiments were done to compare the use of two-dimensional design and three-dimensional design and for non-users of both technologies, and the study resulted the following: Designers were more creative than non-designers when they were given creative mental constructive tasks, and how and when drawing is used as an important thing and that plays a major role in the design thinking process.

Feedback on previous studies

Some previous studies dealt with the role of technology and its effect on design and its outputs as a study done by Al-Tayib (2011), and one of the most important results of the study was that expertise, specialization and practicing in graphics is the secret of creativity technically and technically. Abdel-Maksoud study (2014) is a study aimed at identifying the capabilities of modern digital media and highlighting the role of those applications and capabilities to raise the efficiency of design thought for the printed advertisement, and Al-Zuhlif examined the internet effect on graphic designer skills in Jordan. The study of (Kokotovich & Purcell, 2000) examined the creative aspect of designers and its role in enhancing design skills aiming at examining design issues of creativity and mental synthesis. (Pan, Kuo, & Strobel study, 2013) aimed to verify the designers' attitude and options toward using computers and graphics paper when participating in drawing during design. And the current study has been marked by figuring out the effect of using modern technology in design on graphic designers' skills in Jordan.

Manner and procedures

Study approach: This study depended on the descriptive approach, as it is appropriate for achieving studyobjectives by identifying the effect of using modern technology on graphic designers' skills in Jordan.

Study population: Consisted of all graphic designers in Jordan.

Study Sample: Consisted of (150) graphic designers in Jordan who were randomly selected from the study community, and Table (1) shows the distribution of the study sample according to personal and functional variables.

Table (1), Distribution of study sample according to study variables

Variable	Category	Iterations	Percentages
Gender	Male	57	38.0
	Female	93	62.0
	Total	150	100.0
Age	Aged 25 years or less	40	26.7
	Aged 26-35 years old	79	52.7
	Aged 36 to 45 years old	24	16.0
	More than 46 years old	7	4.7
	Total	150	100.0
Qualification	Secondary and below	25	16.7
	Diploma	89	59.3
	B.A	20	13.3
	Postgraduate	16	10.7
	Total	**150**	**100.0**

Study tool

A questionnaire was prepared to achieve the study objectives, using the previous studies related to the subject of the study (Al-Bakri, 2018; Al-Zuhlaf, 2017; Abdul Maqsoud, 2014; Al-Tayib, 2011; Assal, 2010), as it consisted of (47) item, its finalization consisted final (47) paragraph. The questionnaire included two parts; the first part included the personal and functional variables of the study sample individuals (gender, age, work, educational qualification), while the second part included two areas: The field of use level of modern technology for graphic designers in Jordan, and it consists of (17) Paragraph, and the field of the impact of using modern technology on graphic design skills in Jordan, which consists of (30) paragraphs.

– **Validity of the study**: In order to ensure the indications of apparent honesty of the study tool, it was presented in its primary form to (8) skilled and experienced arbitrators in graphic design, and that for the purpose of judging the degree of integrity and clarity of the linguistic formulation of the paragraphs, and its relevance of a measurement was put in for, and how much each paragraph belongs to the domain that belongs to. In addition to any action requires to delete, amend, or add to the paragraphs of the questionnaire or suggestions seen appropriate, the arbitrators' observations and proposals were adopted, and the questionnaire paragraphs were amended according to the agreement of the majority of the arbitrators, and the questionnaire was finalized.For the purpose of extracting the indications of structural validity of all paragraphs of the questionnaire, it was applied to a survey sample consisted of (25) individuals from the study community and others its sample, and calculating the correlation coefficients between each paragraph and the field to which it belongs and relate to the questionnaire as a whole, and Table (2) shows that..

Table (2)Correlation coefficients between each paragraph and the domain to which they belong and relate to the entire questionnaire

Number	Paragraph correlation to domain	Paragraph correlation with the questionnaire as a whole	Number	Paragraph correlation to domain	Paragraph correlation with the questionnaire as a whole
1- level of use modern technology			7	.769**	.673**
1	.722**	.698**	8	.724**	.700**
2	.765**	.740**	9	701**	.661**
3	.596**	.560**	10	.620**	.589**
4	.479*	.462*	11	.549**	.528**
5	.654**	.619**	12	.725**	.713**
6	.656**	.634**	13	.783**	.765**
7	.875**	.823**	14	.513**	.478*
8	.627**	.509**	15	.469*	.407*
9	.854**	.787**	16	.516**	.469*
10	.615**	.518**	17	.569**	.469*
11	.666**	.554**	18	.519**	.480*
12	.707**	.577**	19	.750**	.654**
13	.860**	.753**	20	.683**	.591**
14	.868**	.763**	21	.713**	.655**
15	.851**	.751**	22	.595**	.558**
16	.609**	.536**	23	.794**	.756**
17	.581**	.554**	24	.673**	.570**
2- The effect of using technology on design skills			25	.650**	.553**
1	.839**	.825**	26	.596**	.545**
2	.861**	.854**	27	.734**	.713**
3	.613**	.612**	28	.876**	.801**
4	.786**	.777**	29	.678**	.668**
5	.466*	.401*	30	.783**	.691**
6	.708**	.616**			

* Acceptable and significant correlation coefficients at significance level (α ≤ 0.05)

 ** Acceptable and significant correlation coefficients at significance level (α ≤ 0.01)

It appears from Table (2) that the correlation coefficients between each paragraph and the domain to which it belongs ranged between (0.466-0.876), as the correlation coefficients between the paragraphs and the questionnaire as a whole ranged between (0.401 -0.854), which are significant and acceptable correlation coefficients for the purposes of applying this study.

– **The stability of the study tool**: In order to ensure the consistency of the study tool, the measurement tool was applied to a survey sample consisting of (30) graphic designers from the study community and out of it, and the Pearson correlation coefficient between the two applications was calculated to extract the

test-retest, as well as applying The Alpha Cornbrash equation to the two fields of study and their total, and Table (3) illustrates this.

Table (3),Cornbrash Alpha and (R. Test) for both fields of study

Field	Cornbrash Alpha	R. Test
The level of using modern technology for graphic designers	0.93	0.89
The effect of using modern technology on graphic design skills	0.86	0.89
Total	**0.95**	**0.90**

Table (2) shows that the internal consistency coefficients of "Cornbrash alpha" ranged between (0.93-0.86), as the Cornbrash's alpha coefficientof the total reached (0.95), and the stability coefficients for the two fields of study reached (0.89), and the stability coefficient of repetition of the total (0.90), and all stability factors are high and acceptable for the purposes of the application of the study, where the stability factor (Cornbrash Alpha) is considered acceptable if it exceeds (0.70).

Correcting the scale: The questionnaire consisted of (47) items in the final form, whereas the researchers used a Likert scale for the five-year scale in order to measure the opinions of the individuals in the study sample, and strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1) were given, by placing a sign (√) in front of the answer that reflects the degree of their approval, and the next classification was also relied upon to judge the arithmetic averages: (less than 2.34 low, from 2.34-3.66 medium, and from 3.67 to 5.00 high).

Statistical treatment
In order to answer the study questions, the following statistical treatments were used through the SPSS program:

1.   Repetitions and percentages of personal and functional variables for the study sample individuals.
2.   Arithmetic averages and standard deviations for all paragraphs of the two fields and their general average.
3.   3. Multiple Variation Test (MANOVA) to detect differences in the two fields of study, according to variables: gender, age, and educational qualification.
4.   4. Applying 3-Way ANOVA to detect the differences for the instrument as a whole, according to variables: gender, age, and educational qualification.

The study result and its discussion
This part includes the presentation of the results of the answer to the study questions, which aims to identify the effect of using modern technology on the skills of graphic designers in Jordan, as those questions were answered.

The results of answering the first question: What is the level of using modern technology methods among graphic designers in Jordan? In order to answer this question, arithmetic averages and standard deviations were extracted for all the

paragraphs of the field "The level of use of modern technology means among graphic designers in Jordan", and Table (3) shows that.

Table (4), Mathematical averages and standard deviations for the field of "use level of modern technology for graphic designers in Jordan"

Number	Paragraph content	Mathematical averages	Standard deviations	Degree	Rank
2	Use the computer to smoothly organize the design elements.	4.87	0.50	High	1
1	Use computers and the Internet to get self-education in design.	4.84	0.54	High	2
12	Search for different models to serve my design online.	4.82	0.39	High	3
8	Communicate with clients through modern communication technology.	4.75	0.67	High	4
7	Share ideas and opinions with others in the field of design using the Internet.	3.72	0.96	High	5
9	Employ modern technologies and devices in my designs show.	4.53	0.85	High	6
11	Use modern technology to communicate the design idea in a sequential manner.	4.47	0.50	High	7
10	Apply designs on the day I check them by employing design programs.	4.15	0.99	High	8
3	Use modern technology to be given updateson design.	3.35	0.48	Average	9
4	Use modern technology for planning before beginning the design process.	3.34	0.48	Average	10
5	Get information related to design by the Internet.	3.00	0.00	Average	11

6	Review designs using computer and specializedprograms.	3.00	0.00	Average	12
17	Use design programs for more color shades options.	3.00	0.00	Average	13
16	Use the directing art provided by modern technology to achieve the required effect.	3.00	0.00	Average	14
15	Employ design programs to choose the right sizes while designing.	3.00	0.00	Average	15
14	See the current developments in graphic design through communication technology	3.00	0.00	Average	16
13	Use my computer and specialized programs to correct errors of writing during design.	3.00	0.00	Average	17
Total		3.75	0.18	High	

It appears from Table (4) that the arithmetic averages and the standard deviations for all paragraphs of the field of "the level of use modern technology among graphic designers in Jordan", where the most prominent was for paragraph (2) which provides "Use the computer to organize design elements in a homogeneous manner" with an arithmetic average of (4.48) and at a high degree. While it came in second place, paragraph (1), which provides for, "Use the computer and the Internet to obtain self-education in design" with an average score of (4.84) and with a high degree, and paragraph (13), which provides for "Use the computer and specialized programs in correcting" Errors of writing during design "with an average score of (3.00) and with a moderate degree, the arithmetic average for the field "the level of use modern technology among graphic designers in Jordan" (3.75) and with a high degree. The researchers see that the reason for this is the nature of the graphic designer's job, which requires the use of modern technology to control images, fonts, colors, shapes, texts, and website design to communicate the real meaning of the audience. In addition to that the graphic designer is a very important element in the field of advertising and he is a creative artist who likes innovation and creativity, so he must use high-quality technological means to make professional progress, and that modern technology has helped graphic designers to communicate with customers through it,and employing modern technologies and devices in the presentation of graphic designs, and use modern technology to see developments in design. This result is consistent with the study result of Abdel-Maksoud (2014), which showed that modern technology means helping the designer to make new formations and discover attractive design

dimensions, as it has an effect on the recipient and increases his imaginative and creative ability and reflects his capabilities in dealing with the vocabulary of that modern technology.

The answering results of the second question: What is the effect of using modern technology on graphic design skills in Jordan? To answer this question, arithmetic averages and standard deviations were extracted for all paragraphs of the field "The effect of using modern technology means on graphic design skills in Jordan", Table (5) illustrates this.

Table (4), Mathematical averages and standard deviations for the field "The effect of Using Modern Technology on Graphic Design Skills in Jordan"

Number	Paragraph content	Mathematical average	Standard deviation	Degree	Rank
3	Technology has made it easier to handle design elements.	4.89	0.32	High	1
12	Modern technology provides the designer electronic programs easy to deal.	4.79	0.62	High	2
29	Modern technology programs have made it easier to combine colors with effects.	4.63	0.48	High	3
21	Modern programs have provided various shapes, symbols and logos.	4.61	0.49	High	4
7	Modern technology has provided designers with new and varied inputs.	3.61	0.49	Average	5
4	Modern technologyhas allowed designers to freely market by special accounts	4.60	0.49	High	6
30	The use of the Internet and communication means has increased the opportunity for the designer to find work in design.	4.59	0.49	High	7
22	Modern technology encouraged designers to search for continuous improvement.	4.58	0.50	High	8
2	Modern technology has helped the designer to befamiliar with new markets for design.	4.58	0.50	High	8
23	Modern technology has enabled designers to distance	4.57	0.50	High	10

	education in the field of graphic design.				
20	Modern programs have facilitated selectingthe appropriate fonts for designs.	4.45	0.50	High	11
5	Modern technology has provided the designer with feedback.	4.43	0.50	High	12
6	Modern technology programs have facilitated the addition of various effects to the design.	4.41	0.49	High	13
11	Modern technology has enabled the designer to edit designs.	4.41	0.91	High	13
8	Modern technology has allowed designers to follow modern designs around the world.	3.63	0.49	Average	15
18	Modern programs have enabled using clear colors to highlight designs.	3.59	0.49	Average	16
19	Modern technology has enabled designers to add beautiful and attractive images to the design.	3.51	0.50	Average	17
9	Modern technology has enabled the designer to benefit from the experiences of others.	3.42	0.50	Average	18
10	Electronic programs made it easier to apply and display designers' ideas.	3.26	0.44	Average	19
13	Modern technology has enabled the designer to work with a group of designers and benefit from their expertise.	3.07	1.25	Average	20
14	Modern technology has made it possible to deal with multiple environments with different dimensions.	3.00	0.00	Average	21
15	Modern technology has enabled the designer to produce designs of a high level of quality.	3.00	0.00	Average	22
16	Technology hasmade it easier to produce designs	3.00	0.00	Average	23

	compared to other styles.				
17	Technology provides virtual reality that is less costly.	3.00	0.00	Average	24
24	Modern technology has given the designer an opportunity to evaluate and improve designs.	3.00	0.00	Average	25
25	Technology has allowed the designer to become familiar with the printing elements, and its conditions and characteristics.	3.00	0.00	Average	26
26	The technology has allowed the designer to know the rules and principles of artistic direction.	3.00	0.00	Average	27
27	Technology contributed to know the technical aspects of producing and making designs.	3.00	0.00	Average	28
28	Modern technology has enabled many tasks to be completed in a faster time.	3.00	0.00	Average	29
1	Modern technology enabled the designer to produce high impact on thescenes.	3.00	0.00	Average	30
Total		**3.76**	**0.07**	**High**	

It appears from Table (5) that the arithmetic averages and the standard deviations for all the paragraphs of the field "The effect of using modern technology means on graphic design skills in Jordan", where the most prominent was for paragraph (3) which provides "Technology has made it easier to handle design elements." with an average of (4.89) and with a high degree, while paragraph (12) which provides, "Modern technology provides the designer electronic programs easy to deal." with an average of (4.79) and with a high degree, And in the last rank came paragraph (1), which provides "Modern technology enabled the designer to produce high impact on the scenes." with an average of (3.00) and with an average degree. The overall arithmetic average of the field"The Impact of Using Modern Technology Means on Graphic Design Skills in Jordan" reached (3.76), with a high degree. And perhaps it's because of modern technology which increases and improves the designer designer's performance, and modern technology has allowed designers free marketing through special accounts, and the use of the Internet and communication means has increased the opportunity for the designer to get a job in design, as well as modern technology enabled the designer to produce designs with a high level of quality, and technology provides virtual reality that is less costly., and modern technology has given the designer an opportunity to evaluate and improve designs. This result is in line with the study result of Al-Zohluf (2017), which showed the effect of the Internet means in

raising the level and competence of the graphic designer and enabling them to display and publish their various creative and innovative designs.

The answering results of the third question: Are there statistically significant differences in the level of using modern technology and its effect on graphic design skills among designers in Jordan due to the variables (gender, age, educational qualification)? To answer this question, mathematical averages were extracted for the fields of "the level of using modern technology means and the impact of using them on graphic design skills in Jordan according to the variables (gender, age, educational qualification), and the results showed significant differences among the averages of the two fields of study and the overall scale according to the variables: (Gender, age, educational qualification). And to reveal the statistical significance, multiple variation (MANOVA) was applied to detect differences in the two fields of study according to gender, age, educational qualification, and variance analysis (ANOVA) to detect differences for the variables according to the total, Tables below show this.

Table (6), Results of the MANOVA multiple variation test to detect differences in the two fields of study according to variables gender, age, and educational qualifications.

Independent variable	dependent variable/Study fields	Sums of squares	DF	Average of the squares	F value	Statistical significance
Gender	Level of use	.027	1	0.027	0.836	0.362
	Effect of use	.013	1	0.013	2.805	0.096
Age	Level of use	.145	3	0.048	1.480	0.222
	Effect of use	.014	3	0.005	0.988	0.400
Educational qualification	Level of use	.176	3	0.059	1.798	0.150
	Effect of use	.006	3	0.002	0.420	0.739
False	Level of use	4.626	142	0.033		
	Effect of use	.6780	142	.0050		
Total corrected	Level of use	4.868	149			
	Effect of use	.7100	149			

* Statistically significant at the significance level ($\alpha \leq 0.05$)

It shows from Table (5) above that there were no statistically significant differences at the level of significance ($\alpha \leq 0.05$) for the two fields of study according to the variables (gender, age, educational qualification) where F values did not reach the level of significance ($0.05 \geq \alpha$).

Tables (7), Results of the (three-Way ANOVA) analyse to detect differences for the tool as a whole according to variables gender, age, and educational qualifications.

Independent variable	Sums of squares	Degrees of freedom	Average of the squares	F	Statistical significance
Gender	0.049	1	0.049	6.942	0.009
Age	0.071	3	0.024	3.396	0.020
Educational	0.037	3	0.012	1.755	0.159

qualification					
False	0.9950	142	0.007		
Total corrected	1.160	14			

* Statistically significant at the level of significance (α≤0.05).

Table (7) shows that there are statistically significant differences at the level of significance (α≤0.05) according to the age variable, where the value of F (3.396) and with a statistical significance (0.020).To reveal the differences, (Scheffe test) was applied; (Table 8) explains it. And there are statistically significant differences at the level of significance (α≤0.05) according to the gender variable, where the value of F (6.942) with statistically significant (0.009), and the differences were in favor of males with an arithmetic mean (3.81). This indicates that the ratio of males working in the field of graphic design is higher than that of females, and that males who work in graphic are creative and technically qualified, as their work is determined in making a secondary vision of reality or a new vision through very many ways.

Table (8), Results of Scheffe test to detect differences in the total score of both fields of study, "according to the age variable

Independent variable	Category	Mathematical average	25 and under	26-36	36-45	46 and more
Age	25 and under	3.81	-	0.04	0.07*	0.03
	26-36	3.77	-	-	0.03	0.01-
	45-36	3.74	-	-	-	0.04-
	46 and more	3.78	-	-	-	-

It shows from Table (8) above that the differences were between the categories "25 and less" and "from 36-45 years" in favor of the category "25 years and less" with an average of (3.81), while the average for the category "36-46 years" (3.74). This is due to the fact that graphic design works and advertisements appeal to those in the prime of life and youth category more than the elderly, they are interested in publications and design models, and their interest in graphic design makes any publication or graphic model more beautiful when reading, and makes things go in a more clear and smooth way.

Recommendations
In light of the study results, the researchers recommend the following:

1.   Encourage graphic designers using customized software in order to correct their mistakes.

2.   Encourage graphic designers to look through the up-to-date in the field of graphic design through communication technology.

3.   Carrying out more studies looking at the impact of using modern technology on the skills of graphic designers in Jordan.

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