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The Impact of Using a Digital Arts-Based Strategy in Developing Artistic Production Skills

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Abstract

Objectives: This study investigates the effectiveness of a digital arts-based teaching strategy in enhancing artistic production skills among ninth-grade students in Jordan. It aims to explore how digital tools and creative approaches can be integrated into art education to foster students' functional, aesthetic, and evaluative skills.

Methods: The research employed a quasi-experimental design involving 56 ninth-grade students from the Pioneer Educational Schools in Jordan, divided into experimental and control groups. Data were collected using a specially designed achievement test and a 27-item evaluation rubric covering five key dimensions: the functional aspect, processing, aesthetic and structural foundations, structural system, and evaluation.

Results: Statistical analysis showed a significant improvement in the experimental group's performance compared to the control group, suggesting that the digital arts-based strategy had a notable impact on skill development.

Conclusions: The study concludes that incorporating digital arts into the curriculum significantly supports the advancement of students' creative abilities and recommends its broader application in primary education.

Keywords: Artistic production, digital arts, ninth-grade students, schools.

أثر استخدام استراتيجية مستندة إلى الفنون الرقمية في تنمية مهارات الإنتاج الفني لدى طلبة الصف التاسع الأساسي في الأردن

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ملخّص

الأهداف: هدفت الدراسة إلى تعرّف أثر استخدام استراتيجية مستندة إلى الفنون الرقمية في تنمية مهارات الإنتاج الفني لدى طلبة الصف التاسع الأساسي في الأردن.

المنهجيّة: تتضمن المنهجية استخدام المنهج التجريبي ذي التصميم شبه التجريبي، وشملت أفراد الدراسة طلبة الصف التاسع من مدرسة التربية الريادية في الأردن وعددهم (56) طالبًا؛ حيث يبلغ عدد الطلبة في كل مجموعة (28) طالبًا، ولجمع بيانات الدراسة جرى تطوير اختبار، وبطاقة تقييم لملاحظة مهارة الإنتاج الفني مكونة من (27) فقرة، موزعة على خمسة مجالات، وهي: الجانب الوظيفي، المعالجة، الأسس الجمالية والإنشائية، تحقيق النظام البنائي، الإخراج.

النتائج: أظهرت نتائج الدراسة أن أثر استخدام استراتيجية مستندة إلى الفنون الرقمية في تنمية مهارات الإنتاج الفني لدى طلبة الصف التاسع الأساسي في الأردن بوجود أثر ذي دلالة إحصائية بين متوسطي علامات المجموعتين الضابطة والتجريبية، ولصالح المجموعة التجريبية.

الخلاصة: أوصت الدراسة بتوظيف الفنون الرقمية كاستراتيجية تدريسية في تدريس مادة التربية الفنية لطلبة المرحلة الأساسية.

الكلمات الدالّة: الفنون الرقمية، الإنتاج الفني، طلبة الصف التاسع الأساسي.

1. Introduction

Of late, scientific and technological progress in digital arts has led to the discovery of new media that can be used in various ways in artistic production. Contemporary artists have adopted these advanced media and techniques in their works (Abdullah, 2019). Which has led to the transformation of 3D design techniques from traditional formulations to modern digital formulations that keep pace with the aspirations of the era. Art education works to direct the intellectual and aesthetic level of society by following artistic innovations and keeping pace with continuous technological development (Al-Buqami, 2021).

Given the development of individuals in the field of art, educational institutions have become increasingly interested in the arts in recent decades to improve the quality of the educational process and solve problems by reducing costs and increasing the efficiency of teacher and learner performance. The Arts contribute to meeting the changing needs of the educational environment that depends on content and strategy together, with a focus on the elements of the educational process such as curriculum, teacher and learner, so the teacher must choose the appropriate teaching strategies and methods for the subject of art education to achieve the desired educational goals. The modern digital revolution has affected the form of artwork and the process of its production and has provided new horizons for creativity and artistic expression in all artistic fields (Al-Shammari, 2020).

Digital Art is a term given to the fine art movement that uses computer technology, advanced effects, and the artist starts with an idea in their mind and tries to bring it to life on the screen (Abdullah, 2019). One of the most important features of digital art is the ability to easily correct mistakes at any stage of the drawing process. Also, digital art allows for the creation of copies of artwork, as it allows for the reproduction of many copies of drawings and artistic images. Moreover, digital art is characterized by its low cost, as it is much less than reproducing traditional artworks. In addition, it enables the artist to publish his works via the Internet so that people can easily view them electronically, thus enabling them to obtain copies of those artworks and make backup copies of all completed artworks (Al-Buqami, 2021).

Artistic production skills (APS) are also of particular importance for digital art. Through practicing digital art production, the student can develop a strong relationship with the complex artistic composition that art production suggests and develops the process of emotional release, the ability to respond to situations, and aesthetic appreciation. Through artistic production, students become familiar with a wide range of different art disciplines, their materials, tools, methods, and techniques used in these modern digital arts (Al-Shammari, 2020).

There is a strong and dynamic relationship between digital arts and artistic production skills. This connection is vital because both are key artistic skills used to achieve creative goals, even though their methods and approaches may differ.

Additionally, the relationship between digital arts and production skills helps develop learners' human values, enhances their emotions and cultural awareness, and strengthens their intellectual growth. It also plays a crucial role in shaping their personalities, supporting educational goals.

Understanding this relationship has important implications for future educational practices. As digital tools continue to evolve, integrating them into artistic education can enhance creativity, improve technical skills, and foster a deeper appreciation for the arts.

With this foundation, the following section presents the related literature review.

2. Literature Review

Research and studies have documented the main themes and concepts of the digital arts (Lovin & Lambeth, 2015; Al-Amro, 2016; Abdullah, 2019; Al-Farani & Al-Amoudi, 2021). There is a variation in the populations of previous studies, the number of individuals in their samples, their locations, their job roles, the targeted category, and the nature of the institutions in which the study was conducted. These previous studies varied in research methodologies and data collection means due to the differences in their populations, the number of individuals in their samples, and the methodology of selecting them.

The difference in their results depends on the differences in their objectives and variables, and consequently the difference in research methodologies, data analysis, and significance. Importantly, this study is distinguished from other

previous studies in its objective reflected in identifying the impact of using a strategy based on digital arts in developing artistic production skills among ninth grade female students. What also features this study is the inclusion of the digital arts used in developing artistic production skills. With this in mind, the research problem is given in the following section.

3. Research Problem

Art education is one of the abstract subjects that students find difficult to represent and understand. The art education class in the primary stage faces many challenges that hinder its effectiveness, as these challenges emerge in the use of traditional teaching methods that limit students' activity and effective participation. Among the key problems related to art education is the failure to exploit digital arts to develop artistic production skills and artistic appreciation within the art education subject, in addition to not keeping pace with modern technological developments that can contribute to enhancing these skills (Al-Farani & Al-Amoudi, 2021). Accordingly, the research problem is reflected in answering the following main question:

What is the impact of using a digital arts-based strategy in developing artistic production skills among ninth-grade female students in Jordan?

4. Research Hypothesis

Given the research problem, objective, and question, the following hypothesis was formulated:

There is no statistically significant impact at the significance level ($\alpha = 0.05$) of using a strategy based on digital arts in developing artistic production skills among ninth grade female students in Jordan.

5. Research Significance

The significance of the current research study is reflected in emphasizing the importance of keeping art education subject up to date with developments in the field of art, art production skills and artistic appreciation by clarifying the concept and its elements and linking it to the field of learning and education. Besides, the study of digital arts technology, artistic production skills and artistic appreciation may open new horizons and venues for artistic vision, which leads to deepening and expanding students' intellectual and creative awareness in their study of digital arts.

Importantly, the expansion of digital arts, artistic production skills and artistic appreciation also contributes to consolidating the relationship between art and modern digital technology. It may also guide art education teachers to the importance of digital arts, which enriches their teaching methods of art education. It is hoped that this paper will enrich the academic field and art education literature in general, and the study sample in particular, which will take advantage of the study results and suggestions.

6. Research Terms & Definitions

In this research study, the terms “Digital Arts”, “Artistic Production”, and “Krita” are mentioned, and their procedural definitions are as follows**:**

Digital Arts: They include the process of drawing using electronic tools and special applications instead of using the traditional method of pens, crayons, and paper. Digital artists use tablets and computers in addition to basic electronic tools such as a mouse or an electronic pen (Al-Buqami, 2021). Procedurally, digital arts are defined as the production and design of digital paintings and artworks using the digital art program “Krita” employed in teaching the experimental group of ninth-grade students.

Artistic Production: Artistic production refers to a creative work that combines intellectual and visual content, created using natural or manufactured materials. It can be shared with an audience through real or virtual communication networks (Ismail & Badawi, 2022).

For this study, artistic production is defined as the score participants achieve on a test and evaluation card designed to assess their artistic production skills in alignment with the research objectives.

Krita: It is a program for creating and editing professional digital artistic images and drawings, whether illustrative, animated, or comics. It is also a free source program that processes digital images and focuses specifically on digital drawing. Procedurally, it is defined as a program used to produce and design digital paintings and artworks employed in teaching the experimental group of ninth grade students prepared to achieve the research objective.

7. Theoretical Framework

The theoretical framework is constructed to thoroughly address the concept of "Digital Arts" and "Artistic Production".

7.1 Digital Arts

The early fifteenth century witnessed a multiplicity of artistic schools in Europe. However, after 1600, the religious, political and intellectual changes that appeared in European societies played an effective role in the emergence of artistic styles that served the bourgeois classes and ruling families, such as Rococo and Baroque. Since the beginning of the 19th century, artistic movements have emerged in the West, such as Neoclassicism, followed by the emergence of Romanticism and Realism. With the modern scientific discoveries in the field of light, the camera appeared as a prelude to the emergence of the Impressionist School.

With the beginning of the 20th century and the emergence of Cubism, Expressionism, Fauvism and Futurism, creativity took many forms that had a profound impact on society**.** Trends, influenced by the destruction that hit the world because of World War I, such as Dadaism, also has emerged. The adoption of psychoanalysis by psychologist Sigmund Freud was the reason for the emergence of the Surrealism and Tajridiaism trends**.** With the spread of modern art movements around the world, the circles of creativity expanded until they appeared in Egypt with the beginning of the establishment of the School of Fine Arts in 1202 (Ibrahim, 2015).

Digital art consists of two-dimensional digital art and three-dimensional digital art. Two-dimensional digital art refers to a type of art that relies on flat drawing, neglecting the depth of height, and focusing on the length and width of the elements designed via the computer, meaning that it depends on direct vision of the elements through only two themes, horizontal and vertical (Ismail & Badawi, 2022). Digital art is a combination of technology and creativity that is embodied in changing the culture of expression and gives a new visual era**.** The most important feature of digital arts is that they use contemporary energies such as lasers and electricity, as well as their agreement with the latest scientific theories and their applied innovations**.**

Likewise, the digital arts have not been based on individual effort, but engineers or the first technical expertise were always utilized whenever there was a need to use assistants, as the subject is characterized by freedom, which is one of the most important features of Contemporary art, noting that the selection base is increasingly broad (Metwally, 2021). Lovin & Lambeth (2015) point out the importance of digital arts in contributing to the refining and polishing of the learner, which contributes to enhancing positive and human values. Digital arts also help the learner achieve psychological and emotional stability and balance and allow him to learn about society and its issues and address them in an attractive and soul-loving way, which enhances noble human and religious values and facilitates the inculcation of positive traditions and customs in the souls of learners. In addition, digital arts develop morals and positive feelings towards society and social events considering the spread of ignorance and corruption in its various forms and their consequences.

Given the nature of the current research work, Krita, a professional digital art and graphic design program for creating and editing digital images, illustrations, animations, or comics, is selected for producing digital paintings and artwork. Krita is also a free-to-use digital image processing program that focuses specifically on digital painting**.** Although it can be used to modify or even edit images, it has an interface influenced by both Adobe products and digital painting applications and programs such as Corel**.** Subsequently, any Photoshop user can easily and quickly learn how to use the program. Krita offers many popular and innovative features to make digital drawing more fun and productive in the fastest time, effort and at the lowest possible cost.

Gardner (2022) points out the advantages of Krita, which are that it is a free source program and is characterized by ease of use, as Krita supports many color spaces, for example: CMYK and RGB with 8 to 16-bit channels, as well as 16-bit to 32-bit floating-point channels. Krita also provides the user with a customizable multimedia interface that works on touch screens and desktops and furnishes multiple and wonderful brush engines for drawing and coloring, and digital inking stabilizers. Krita also offers many templates that are useful ways to create professional digital designs and offers the most popular formats and files among users, including PSD**.** Krita also supports various other program files, including Photoshop files, with the ability to edit and modify previously saved images or create them from scratch (Gay, 2011)**.**

Despite the distinct advantages and creative potential of digital arts, they face many challenges and obstacles. Al-Hussein (2012) points out that digital artworks face several challenges, including the lack of copyright protection and unauthorized copying. They can also be subject to distortion and forgery, making it difficult to verify their authenticity. There is also the risk of losing or damaging work. Digital works may be lost or damaged if they are not properly preserved, especially if there is no non-digital copy of them. In addition, digital works lack the original touch and natural feel of traditional artworks. Digital arts play an important role in enhancing modern artistic production, providing innovative tools and techniques that allow artists to express their visions in unconventional ways using digital technology.

Digital arts also allow for experimentation and implementation of ideas faster and more efficiently compared to traditional methods. Artists can create artworks that are characterized by precision and intricate details, which enhances the quality of artistic production. In addition, digital arts allow artists to reach a wider audience through online platforms, which increases the spread of their work and enhances interaction with viewers. Thanks to these innovations, artistic production has become more diverse and advanced, taking advantage of the vast possibilities offered by digital technology (Al-Fadl, 2014).

7.2 Artistic Production

Artistic production is the first step to understanding the art process, as it has two key meanings**.** The first is the production or works of artists, which is used as a source among many other sources for teaching art**.** The second reflects the process of artistic production of students through the educational process, as production takes two levels, the first at the artist level and the other at the student level**.** Through artistic production, students become familiar with a wide range of different art disciplines, materials, tools, styles, and techniques used in these arts**.** At the same time, students learn about traditional and Contemporary arts and learn how to express ideas and feelings in visual forms (Al-Farani & Al-Amoudi, 2021).

Artistic production is of particular importance for art education, as practicing artistic production enables the student to develop a strong relationship with the complex artistic composition that art production suggests and develops the process of emotional release to have the ability to respond to situations and aesthetic appreciation (Al-Amri, 2014). Art education in schools presents challenges for teachers in discussing art appreciation activities, as they tend to focus more on practical activities**.** Students, in turn, prefer working with different art media to discussing art history or talking about artworks**.** Therefore, teachers highlight the importance of preserving students' individual artistic characteristics, as activities used in art media provide middle school students with high opportunities to express their individuality and explore their own interests (Al-Amri, 2014).

8. Method

Research Approach

The experimental approach with a quasi-experimental design was utilized to identify the impact of digital arts on developing artistic production skills, as it was applied to two groups, one experimental and the other control, to compare the means of students' production skills in the test.

Research Sample

The research sample consisting of (56) ninth-grade students was purposefully selected from the Pioneer Educational Schools in Amman, Jordan for the academic year (2023/2024). Two groups were randomly selected and divided into two groups: one experimental group taught using digital arts and the other control group taught using the traditional method, as the number of students in each group was 28 students.

Research Instrument

A thorough review of the theoretical literature and previous studies related to the research study subject (Abdullah, 2019; Al-Farani & Al-Amoudi, 2021), alongside consulting some specialists in arts and technology, a 2-task test was developed and a 27-item artistic production skill evaluation card distributed over five areas was used, noting that the final mark of the test is within a three-point grading scale "(2) excellent skill mastery, (1) partial skill mastery, (0) lack skill mastery".

Research Instrument Validity

Face Validity

Face validity is used to check the research instrument validity by reviewing the evaluation card in its initial forms from (10) experienced and specialized faculty members in teaching the arts and technology in the Jordanian universities. The comments, modifications, and recommendations on the research instruments proposed by the validators are considered, as the items have obtained an approval rating of (80%) or more. The necessary action is taken with the items suggested to be deleted, modified, or reformulated, and thus the evaluation card in its final form consists of (27). This method is suitable for checking the face validity of the evaluation card, that is, its items can measure what they are set to measure. The scale's research instrument validity was also ensured using the internal consistency method. The research instrument is distributed over five dimensions: functional aspect, processing, aesthetic and structural foundations, the structural system, and evaluation. The construct validity coefficients were also calculated, ranging between (610.) and (914.) and (714.) and (912.) for the dimensions, with appropriate correlation coefficients.

Research Instrument Reliability

To check the research instrument reliability, the internal consistency reliability coefficient was calculated using Cronbach's Alpha Coefficient. The overall reliability coefficient of the scale reached (0.979), which is an acceptable value according to (Pallant, 2005), and thus the scale has an acceptable degree of reliability, indicating that it is suitable for application to the research study sample.

Statistical Processing

To answer the main research question and process the data statistically, the following statistical methods are used:

First: Descriptive Statistic Measures:

The mean, frequencies and percentages were used to describe the responses of the research sample on the research variables and determine the significance of the items contained in the evaluation card. The standard deviation was also used to show the extent of dispersion of the responses from their mean.

Second: Analytical Statistics Measures

The Analysis of Covariance "ANCOVA" test was used to determine the significance of the differences in the adjusted means and standard errors of the students' scores in the post-application according to the teaching method. Eta-squared was also used to find out the effect size caused by the teaching method.

9. Results

9.1 Results related to the Main Research Hypothesis

There is no statistically significant impact at the significance level ($\alpha = 0.05$) of using a strategy based on digital arts in developing artistic production skills among ninth grade female students in Jordan.

To test the main research hypothesis, the means and standard deviations of the pre- and post-measurement of the experimental group and the control group on a test and evaluation card for artistic production skills were calculated. Table (1) illustrates those results.

Table 1: Means and Standard Deviations of the Pre- and Post- Measurements of the Experimental Group and the Control Group on a Test and Evaluation Card for Artistic Production Skills

Group	Number	*Pre-Artistic Production Skills*		*Post-Artistic Production Skills*	
		AM	SD	AM	SD
Control	28	9.39	7.197	14.54	7.005
Experimental	28	13.25	3.78	44.57	3.28

As indicated by Table (1), there are apparent differences between the mean of the scores of the experimental group and the control group in the post-test on the test and evaluation card for artistic production skills in favor of the experimental group, attributed to a strategy based on digital arts, where the means of the scores of the experimental group were (44.57),

while the means of the scores of the control group for the post-test were (14.54). To find out whether these differences were statistically significant, the Analysis of Covariance "ANCOVA" test was used. Table (2) illustrates the results.

Table 2: ANCOVA Test Results for the Significance of Differences between the Two Groups on the Test and Evaluation Card for Artistic Production Skills

Source of Variance	Sum of Squares	DF	Mean-squared	F-Value	Sig. Level	Eta-squared Effect Size
Group	9688.421	1	9688.421	505.216	.000	.905
Pre	599.451	1	599.451	31.259	.000	.371
Error	1016.371	53	19.177			
Total	14245.839	55				

As shown by Table (2), there are statistically significant differences at the significance level ($\alpha = 0.05$) between the means of the experimental group and the control group on the test and evaluation card for artistic production skills, where the “F-value” was (505.216) and in favor of the experimental group, while the effect size of the strategy based on digital arts on artistic production skills was (90.5%). Table (3) illustrates the results.

Table 3: Adjusted Means and Standard Error of the Post-Test in the Test and Evaluation Card for Artistic Production Skills

Group	Adjusted Means	Standard Error
Control	15.654	.851
Experimental	43.453	.851

As shown by Table (3), the adjusted mean of the experimental group is higher than the adjusted mean of the control group, which is (43.453), while the control group is (15.654).

9.2 Results related to the Analysis on the Dimensions

To analyze the research instrument dimensions, the means and standard deviations of the pre- and post-measurement of the experimental group and the control group on a test and evaluation card for artistic production skills were calculated. Table (4) illustrates those results.

Table 4: Means and Standard Deviations of the Pre- and Post- Measurements of the Experimental Group and the Control Group on the Dimensions of the Test and Evaluation Card for Artistic Production Skills

Dimensions	Group	Experimental		Control	
		AM	SD	AM	SD
Functional Aspect	Pre	3.18	1.056	2.86	2.272
	Post	9.82	0.863	4.32	2.056
Processing	Pre	2.32	1.124	1.79	1.101
	Post	8.68	0.905	2.93	1.152
Aesthetic and Structural Foundations	Pre	2.07	0.900	1.39	1.397
	Post	8.18	0.863	2.25	1.669
Structural System	Pre	3.25	1.110	1.96	1.666
	Post	9.64	1.569	3.00	1.963
Evaluation	Pre	2.43	0.742	1.39	1.449
	Post	8.25	0.799	2.04	1.374

As shown by Table (4), there were apparent differences between the means of the scores of the experimental group and the control group in the post-test on the test dimensions and the evaluation card for artistic production skills in favor of the experimental group for the strategy based on digital arts. To find out whether these differences were statistically significant, the "Multivariate analysis of covariance" MANCOVA test was used. Table (5) illustrates those results.

Table 5: MANCOVA Test Results for the Significance of Differences between the Two Groups on the Dimensions of Test and Evaluation Card for Artistic Production Skills

Source		Sum of Squares	DF	Mean-squared	F-Value	Sig. Level	Eta-squared Effect Size
Group Hoteling' Value =12.354 Statistical Sig. = .000	Post-Functional Aspect	285.706	1	285.706	199.504	.000	.803
	Post-Processing	310.559	1	310.559	321.100	.000	.868
	Post-Aesthetic and Structural Foundations	305.972	1	305.972	204.736	.000	.807
	Post-Structural System	391.859	1	391.859	159.369	.000	.765
	Post-Evaluation	335.059	1	335.059	372.808	.000	.884
Pre-Functional Aspect	Post-Functional Aspect	28.076	1	28.076	19.605	.000	.286
Pre-Processing	Post-Processing	1.111	1	1.111	1.149	.289	.023
Pre-Aesthetic and Structural Foundations	Post-Aesthetic and Structural Foundations	.157	1	.157	.105	.747	.002
Pre-Structural System	Post-Structural System	.839	1	.839	.341	.562	.007
Pre-Evaluation	Post-Evaluation	1.956	1	1.956	2.177	.147	.043
Error	Post-Functional Aspect	70.172	49	1.432			
	Post-Processing	47.391	49	.967			
	Post-Aesthetic and Structural Foundations	73.229	49	1.494			
	Post-Structural System	120.482	49	2.459			
	Post-Evaluation	44.039	49	.899			
Total	Post-Functional Aspect	557.714	55				
	Pre-Processing	520.839	55				
	Post-Aesthetic and Structural Foundations	587.429	55				
	Post-Structural System	788.214	55				
	Post-Evaluation	608.857	55				

As revealed by Table (5), there were statistically significant differences at the significance level ($\alpha = 0.05$) between the means of the experimental group and the control group on the test dimensions and the evaluation card for the entire artistic production skills in favor of the experimental group, as all the "F-values" were statistically significant at the significance level (0.05). Table (6) illustrates those results.

Table 6: Adjusted Means and Standard Error of the Post-Test in the Dimensions of Test and Evaluation Card for Artistic Production Skills

Dimension	Group	Adjusted Mean	Adjusted Standard Deviations
Functional Aspect	Experimental	9.817	.252
	Control	4.326	.252
Processing	Experimental	8.666	.207
	Control	2.941	.207
Aesthetic and Structural Foundations	Experimental	8.055	.257
	Control	2.373	.257
Structural System	Experimental	9.537	.330
	Control	3.106	.330
Evaluation	Experimental	8.116	.199
	Control	2.170	.199

As displayed from Table (6), the adjusted mean of the experimental group was higher than the adjusted mean of the control group, as the adjusted means of the experimental group ranged between (8.055) and (9.817), while the control group is (2.170) and (4.326).

10. Discussion

Discussion related to the Main Research Hypothesis

There is no statistically significant impact at the significance level ($\alpha = 0.05$) of using a strategy based on digital arts in developing artistic production skills among ninth grade female students in Jordan.

As gleaned from the said results, it is evident that there are statistically significant differences between the means of the experimental group and the control group on the overall test and evaluation card of artistic production skills and the dimensions of the test and evaluation card of artistic production skills for the post-test in favor of the experimental group. This result is attributed to the fact that teaching strategies based on digital arts are modern approaches to using technology to enhance artistic abilities. Digital arts are also an essential tool in developing artistic production skills, as they provide an opportunity for students, especially creative ones, to express their ideas in innovative and advanced ways thanks to modern technologies, helping students overcome traditional barriers and create unique artworks that inspire and enrich their educational process.

Moreover, this result is attributed to the fact that digital arts play a vital role in enhancing artistic creativity and developing diverse skills among students, as modern technological techniques are an innovative means of artistic expression and stimulating innovation among students. Employing digital media in artistic production gives students the opportunity to explore their ideas in new and effective ways, allowing them to present unique and inspiring works, as relying on digital arts enhances cultural and artistic diversity and enriches the educational process. Through the characteristics of digital art, it is clear that the positive impact on students was largely related to the development of artistic production skills, as digital arts allow for easy modification, the abundance of artistic tools when using digital art and a range of colors that can be used extensively, as well as the total cost is less than manual arts, which makes digital arts have a flexible and easy character that plays a positive role in the educational process.

Additionally, the current research results are consistent with the results of Al-Farani and Al-Amoudi' study (2021), which indicated the importance of developing the attitude of secondary school students towards the virtual national museum of fine arts and improving their artistic production in the art education curriculum. Al-Amro's study (2016) also demonstrated the need to enhance the teaching aspects related to drawing and artistic direction with electronic applications to enrich the educational content and develop the foundations of artistic design and enhance students' artistic production skills. Moreover, this research study also agreed with Lovin and Lambeth (2015), which showed the importance of using

technology in teaching art education, which helped students to integrate more into artistic activities and work in groups to develop digital culture skills, artistic production, and the trend towards using technology in artistic production. The current study results also agreed with Al-Amro's study (2016), which showed statistical differences in favor of the students of the experimental group in developing artistic production skills through utilizing an electronic unit based on self-learning.

10. Conclusion

In a nutshell, this paper identifies the impact of using a digital arts-based strategy in developing artistic production skills among 9th-grade students in Jordan. Among the key findings is that using a strategy based on digital arts in developing artistic production skills among ninth-grade students in Jordan has a statistically significant impact between the means of the scores of the experimental and control groups in favor of the experimental group.

11. Recommendations

Considering the previous results and discussion, the paper recommends employing digital arts as a teaching strategy in teaching art education to primary school students for its clear impact on developing students' production and artistic appreciation skills and designing teaching models according to the digital arts strategy and using them in the educational process. Other key recommendations include providing technology and material capabilities to facilitate the task for the teacher to use strategies related to digital arts and conducting further study to investigate the relationship between digital arts and other variables such as developing aspects of talent and creativity and raising the level of academic achievement.

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