

DOI: 10.5281/zenodo.12426985

INTEGRATING THE AESTHETICS OF AFRICAN SCULPTURE INTO MANNEQUIN DESIGN USING FABRIC PASTE WITHIN THE FRAMEWORK OF SUSTAINABLE DEVELOPMENT

Sozan Elsayed Hegazy^{*1}, Abeer Ebraheem EL-Dsoky Mohmed Shalaby^{*2}, Huda Ebrahim Ali Salh⁴, Ayat Ahmed Yousef Abofarag⁴, Amany Elsaid Abdel Baset Abo Seada⁴, Heba Mohamed Abulfotoh Ibrahim Ammar⁴, Aya Adel Hassb Elnaby Elsadek^{*4}, Heba Mohamed Elsayed Mohamed AboAlela^{*4}, Shimaa Mohamed Amer Nasef^{*3}

¹ Professor of Clothing and Textiles -Department of Clothes and Textile, Faculty of Home Economics, Al-Azhar University, Cairo, Egypt.

² Assistant Professor of Clothing and Textile, Applied College, Baljershi, Al - Baha University, Kingdom of Saudi Arabia, Assistant Professor of Clothing and Textile, Department of Home Economics - Faculty of Specific Education, Mansoura University, Mansoura, Egypt.

³ Assistant Professor of Clothing and Textiles -Department of Clothes and Textile, Faculty of Home Economics, Al-Azhar University, Cairo, Egypt

⁴ Lecturer of Clothing and Textiles -Department of Clothes and Textile, Faculty of Home Economics, Al-Azhar University, Cairo, Egypt

Received: 09/10/2025
Accepted: 10/03/2026

Corresponding Author: Sozan Elsayed Hegazy

ABSTRACT

Sources of inspiration are crucial in the design process, as they act as the first trigger for creative ideas. Therefore, to maintain our interest and provide the best possible artistic expression, designers must constantly update their sources of inspiration, particularly in light of the current trends of material substitutes, and environmentally and waste-friendly procedures. In the last decade, processed textile materials in general and fabric paste in particular have drawn more attention as a sculptural medium for creating three-dimensional forms that combine lightness and flexibility with aesthetic expressiveness. It is a method that can transform ordinary fabric into three-dimensional forms with a variety of sculptural qualities, and it is a means of investigating concepts in modern art and design. Because it is so powerful, abstract, and architectural in its beautiful distortion of planes, African sculpture is among the most symbolic and structurally complex art forms in the world. Thus, this art form is increasingly inspiring other creative areas, because of its sculptural values that are capable of being reinterpreted and transferred to designs of contemporary designs that can be enriched with cultural and artistic content. In light of the global promotion of green growth and resource use efficiency, the place of recovered textile materials or textile waste serves as a green medium in art and design production. Therefore, the importance of this research is to investigate the utilization of fabric paste as a sustainable material to design clothing based on African sculpture through the use of a mannequin as a medium for expression; by doing so, the research will add to innovation and the realization of sustainable values. The

research followed the descriptive methodology because it is the best way to achieve its objectives. In addition, two surveys were conducted as part of the research to collect feedback from experts and consumers on the resulting designs. Statistical analysis is used to further investigate several features of the suggested designs. The study concludes that using fabric paste facilitates new sculptural expressions and technical procedures that will contribute to the diversification and enrichment of evening wear, formal attire, and performance costumes.

INTRODUCTION

Sculpture has a continuous history from the Stone Age to the present day and is largely acknowledged as one of the earliest human artistic endeavors. It was practiced long before the other artistic disciplines. Sculpture is a language with human and symbolic elements, just as its early artistic counterparts. Because it is an intellectual and practical creative product created by human hands that is abstracted from real life, the human dimensions of its outcomes are closely tied to it. It has always been a way to comprehend and connect with nature. The idea must first solidify for art to be created (Al-Ahmad, 2001, p. 295). African art has received more attention in this era, particularly the knobs and domes of its culturally significant sculptures, which have come to be visually associated with one of the oldest forms of African artistic expression and are so deeply ingrained in African society that they can be used as gifts for everyday activities or as items for ritual events. African art was one of the most important and essential sources of inspiration for many European artists during their many stages of artistic exploration (Awad Eissa, 2016, p.293).

Sculpture has also been a successful channel for numerous cultures to convey their values and ideas, as well as their magical, social, religious, and political ideologies. These characteristics are related to historical periods in sculpture, which inevitably had a formative influence on scenic art. The art of sculpture is characterized by aesthetic, emotional, and ultimately absolute subjective values that are discovered through the lens of various discussions and artistic movements connected to the art of modernity. The century, with its many schools and artistic tendencies, saw an incredible metamorphosis in the practice of technique, now stressing the experimental use of materials. Materials were no longer just a substance to use in making things, but an independent concept. The Victorian concept of progress was brilliantly exemplified by contemporary art of the 20th century, since it provided simple lessons on how to break with conventional materials and look for new ones that the artist would be able to transform into innovative and original shapes. This allowed escape from mimetic traditions and from traditional paths and offered opportunities to experiment with other and strange ways and new paths in the field of inspiration artistica (Afaf Ahmed, 2010, p.1393).

LITERATURE REVIEW

A number of reviews have dealt with the African

origin in the art of sculpture. For instance, the research of (Hussein Milad Abu Sha'ala 2025) investigated the reasons that drove the contemporary artists to be interested in African art, to record the most famous works that the heritage has produced, and to analyze African masks as an artistic model and at the cultural, aesthetic and symbolic level resides at what should be focused on to seek for "originality" when inspired from the masks. Likewise, the research of (Reham Kamal 2024) analyzed the expressive and aesthetic potentials of African arts in an effort to find a methodology for the teaching of sculptural technique in the creation of sculptural pieces based on the formative and expressive attributes of African art. In addition, the research of (Mervat Abdel Ghani 2021) identified the trends and formative expressions of relief in modern art and investigated the expressive and technical potentials of relief in the period of modernism. The research of (Ehab Fadel et al. 2021) studied the African heritage in the design of modern women's dresses, particularly modern dresses, through designing new styles inspired by the African heritage and also giving up the traditional characters in the research regions. The research of (Cécile Iskandar, 2013) examined a few selected elements compatible with the design of the Egyptian women's jilbab of certain African geometric and botanical decorative units, bringing to light how African art can serve as an abundant source for any designer, and especially for fashion designers.

The research of (Mohamed El-Shorbagi et al. 2014) evaluated the prospects and the challenges for taste development in sculpture arts and the extent of its influential field as a domain in the visual arts. In addition, the research of (Youssef Al-Malifi and Abdel Rahman Al-Sharrah, 2019) examined the use of the red color in contemporary sculpture from structural and expressive perspectives as a structural and expressive element in contemporary sculptural constructions. The research of (Nasef, S.M.A. et al. 2023) investigated the utilization of the polyurethane foam as an artistic inspiration and novel technique in fashion design through mannequin-based forming ways, while striving toward accomplishing goals of sustainable growth, adopting green production and consumption methods, inciting creativity and innovativeness in design, and direct mannequin modeling. Likewise, the dissertation of (Shadi Seif El-Din 2022) demonstrated the impact of material synthesis as a source of inspiration for visual creativity in mannequin modeling: presenting novel design ideas conceptualized through an open-structured

mannequin technique to manifest fashion designers' creative insight while functioning with the material synthesis method in fashion design. The study of (H. Slama *et al.* 2024) elaborated an aesthetic solution for designing fashion accessories by upcycling used textiles and garments, in line with the principles of sustainable development. Finally, the research of (Maha Talib Al-Zahrani and Emad El-Din Johar 2024) sought to make an impact on the environment by reclaiming household waste for sustainable use and transforming it into art, utilizing metal can covers for the making of clothing accessory items.

Along with developments in 3D sculptural modeling, there has been an increasing demand to use a variety of materials to investigate sculptural forms and mirror the impact of the material. Consequently, the present work aspires to be inspired by African sculptural art in terms of design to fashion novel designs for mannequin-based modeling with the use of fabric pastes so as to formulate new compositional and technical solutions that would add to the array and richness of evening wear, formal wear, and performance costumes.

The Research Problem can be formulated through the Following Questions:

1. Could African sculptural art be employed as a source of inspiration for dress design and modeling on mannequins using fabric paste?
2. In what way may fabric paste be used to develop new, aesthetic women's designs that could be worn as evening, formal, or stage wear and meet sustainability goals?
3. What are the technique requirements for shaping and patterning fabric paste on a mannequin?

Research Objectives:

The present research investigates the feasibility of using fabric pastes in clothing design and the aesthetic possibilities of this unique material, aiming:

1. To produce a selection of women's designs in fabric pastes unified by the theme of African heritage, that could be worn as evening wear, formal wear, or stage wear.
2. To present new techniques for designing/modeling on a mannequin with a fabric paste.
3. To emphasize the aesthetic values of African sculptural art.

Research Importance

The significance of this study lies in:

1. Using the results of the study to hold training courses for the application.

2. Leading to the production of cost-effective and quality products that are compliant with sustainability principles.

3. To catalyze the development of new formative materials and technical processes capable of increasing the variety in the field of clothing.

4. To make closer links between the arts through unique technical and aesthetic solutions.

5. To emphasize the necessity to train with unconventional materials in mannequin-based design and modelling, and investigate new formative approaches for the production of new-age art pieces.

RESEARCH METHODOLOGY

The research follows the descriptive approach because of its suitability to achieve the research objectives.

Research Hypotheses

1. There are statistically significant differences between the designs according to the opinions of the experts, and principles of design, the technical aspects of fabric pastes, and the innovative dimension.
2. African sculptural art can be utilized as a source of inspiration for designing and modeling on mannequins using fabric paste, according to the opinions of the experts.
3. There are statistically significant differences between designs inspired by African sculptural art and fabric paste, according to the opinions of the consumers.

Research Limitations

The study is limited to examining the formative potentials of fabric pastes through the production of a variety of women's designs that align with contemporary fashion trends.

Research Tools

1. A questionnaire to identify the opinions of the experts about the implemented designs.
2. A questionnaire to identify the opinions of the consumers about the implemented designs.

Research Terminology:

African Art: The notion of "African art" encompasses those arts produced on the continent in past and present times through various occupational and civilizational spheres (Hibatullah Johar, 2008, p. 18). It is supposed to serve the needs of the African community and be handed down to the following generations (Asmaa Khattab, 2018, p. 322).

Sculpture: The word "sculpture" in language means

to cut or carve. Sculpture is the art of using mass and void, surface roughness and smoothness, light, and the light's reflection in the vicinity, among other things. In order to be expressive and representational and to establish its artistic and formative significance, sculpture demands an organized, purposeful background, similar to architecture (Mohsen Atiyah, 1995, p. 159).

Designing on Mannequin: Fashion design is one of the fine arts disciplines where a person delves into a sense of artistic expression, aesthetic value, and the power to dream; fabric is viewed as a medium that can be manipulated as a canvas to express the dream in the form of artistic creativity, which is how the term "fashion design" originated. Instead of working on a two-dimensional, flat surface with a two-dimensional pattern that we then stitch together and drape fabric over, we design the garment in three dimensions on the mannequin. This approach allows the designer the greatest amount of flexibility to implement the design concept and unrestricted expression of the artistic elements (Nagwa Shokry & Soha Abdel-Ghaffar, 2009, p. 32)

Modeling on a Mannequin: It is the skill of creating unique outfits based on predetermined standards. It is a dynamic process that calls for expertise, experience, and a tolerance for error. It may be included in the process of creating ready-to-wear clothing and is a technique used for designing fashion and working out 3D patterns of clothes. This approach is particularly suitable for distinctive designs that are difficult to achieve using flat patterns (Nagwa Shokry, 2001, p.44)

Fabric Paste: It is a flexible substance created with fabrics combined with adhesives or other liquid solutions acting as stabilizers that give them formability. It has the flexibility and stretchiness of fabric with the smoothness and workability of modelling paste. Thus, you can mold it straight on a dress form and come up with fresh ideas. The fabric is used for making attire, accessories, and artistic samples while the texture and visual detail of the fabric are maintained. It also helps to bring craft-based innovation with sustainability, as it can be made with easily accessible materials like recycled cloth. It opens up new avenues for research into materials and designing solutions in the field of fashion design (Magda Abdel Wahab, 2004, p.148).

Sustainable Development: According to Iman Hamid (2021), it means functioning in a simpler, easier, less expensive method, in the shortest amount of time, with the least amount of resource waste, and meeting the sustainable development goals. Undoubtedly, sustainability is a matter of high

priority, particularly in light of the growing risks of adverse environmental effects from manufacturing waste and the severe economic conditions arising from raw material shortages. Raising awareness among producers and customers is also necessary, as is discussing ethical fashion and encouraging social and environmental responsibility through responsible production methods, such as avoiding pollution (Rasha Khalil Wagdy & Wedian Talaat Madin, 2016).

To build a system that is sustainable and only takes from the environment what it gives back, all producers now have an obligation to treat the environment well throughout the manufacturing process. In other words, development that sufficiently meets the requirements of the present generation without impeding those of future generations is known as sustainable development (Grose & Fletcher, 2012).

The textile and clothing industry is among the key sectors involved in environmental and social degradation. Thus, principles of sustainable development aim to reduce environmental impact through the design, manufacture, and use of clothing that protects the environment and utilizes resources efficiently.

RESEARCH THEORETICAL FRAMEWORK

African Sculpture

African art is unique in its forms because of its originality, rhythm, and harmony. This is particularly true of the three-dimensional art of ancient African nations. Some sculpture found in Nigeria, for instance, is made of clay, bronze, and stone, and according to (Mohamed Nour, 2019, p. 80), some of them are superior to some of the sculptures of ancient Greek civilization in workmanship and artistic value. Since materials are the primary means of expression for practically all artists, a variety of materials have captured their interest in contemporary sculpture. Nowadays, the color and characteristics of the materials used in contemporary art have a significant impact on how these works are visually interpreted (Mohamed Yassin, 2005, p.50). Sculpture generally has two main forms: freestanding three-dimensional representation and relief sculpture:

1. **Freestanding Three-Dimensional Representation:** In this form of sculpture, one can view it from all sides as it has three dimensions, i.e., length, width, and height. The artist uses material, either by removing from it or adding to it, to create a three-dimensional form that holds a subject matter of artistic importance. The

sculpture is not attached to any background. It is a freestanding sculpture on an independent base.

2. **Relief Sculpture:** Relief sculpture is made on a flat surface and comes in two forms:
 - **Sunken Relief (Intaglio):** The artist engraves the form into the material beneath the ground level.
 - **Raised Relief (Bas-Relief):** The artist carves around what has been cut out so that the remaining space protrudes from the lower background. It may also be referred to as 'semi-relief', where the shape looks like a freestanding sculpture but remains affixed to a solid background. Bas-relief is frequently related to architectural ornament (Robert Gillam, 1980, p. 12; Mohsen Atiya, 1995, p. 154).

MATERIALS AND METHODS

- Tools Preparation for Fabric Paste Modeling on Mannequins:

We prepared the tools we needed for modeling fabric paste on mannequins from natural or synthetic materials available in our surroundings. These were pen caps, combs, spoons, pins, clips, cardboard, rope, and cloth with protrusions and textures. These kinds of tools make it easy for designers to work with and provide the flexibility to produce a wide range of effects. Among their advantages are the low cost, the large variety of sizes (small and large), and the diversity of shapes (circular, square, and triangular). They need no preparation, and they can easily leave marks on the surface of the paste.

- Experimental Procedure:

The researchers did not control the process of art production; instead, they were investigating the ratios, ingredients, and characteristics of fabric paste and exploring new formulations that would lead to novel, unique fabric paste. The process involved the introduction of various additives and ingredients.

Preparing Fabric Paste:

The researchers made the paste in different ratios, testing various materials and fabrics to alter the paste characteristics and to create different shaping outcomes for clothing.

Ingredients Applied in the Paste used in this Study:

2. 1 cup of water
3. 2 cups of starch
4. 4 cups of white glue
5. 3 tablespoons of transparent varnish
6. A few drops of glycerin
7. ¼ teaspoon of alum

Method: Water and the starch are combined in a small saucepan and whisked clockwise so that the starch is well incorporated, and there are no lumps. Simmer the mixture for a minute or two, then add the glue and the other ingredients, and mix them well. Cotton fabric is added and allowed to absorb the cooked paste. Additional steps include:

1. Glycerin is added to improve cohesion and softness, allowing the paste to be shaped more easily.
2. For more hardness and gloss, the varnish is added.
3. Deterioration of the paste can also be prevented by the addition of alum.
4. Coloring the paste is possible in different ways:
 - a. Add food colors or liquid colors to the paste during the preparation phase
 - b. Dye the paste after the formation phase

Shaping Methods and Processes:

In the end, certain techniques are used to shape the paste, whether it is still soft or after being solidified. To achieve the best results, such techniques must be appropriate for the ultimate shape and function. The complete designs are displayed in the following table:

Table (1) Design and Implementation Steps

Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			

Implementation Steps			
1(2(3(4(
 <p>The paste is added before it cools to the selected fabric.</p>	 <p>The mannequin is wrapped with transparent film stretch to protect it from the paste.</p>	 <p>The complementary section of the dress is formed and allowed to dry.</p>	 <p>Then, it is sprayed with a silver-colored paint.</p>
5(6(7(8(
 <p>The dress is molded on a dress form, using pins to hold the folds and drapes in place, the same way as in the forming process. The resulting dress is allowed to dry in the air and then sewn.</p>	 <p>The dress decorations are tinted with a spray of silver.</p>	 <p>The coloring of the dress is done with a turquoise spray.</p>	 <p>This is the final design.</p>
<p>The rest of the designs are as follows: Design Number Two</p>			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			

Design Number Three			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			
Design Number Four			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			
Design Number Five			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			
Design Number Six			
Source of the Quotation	Front View of the Design	Back View of the Design	Side View of the Design
			

Design Number Seven			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			
Design Number Eight			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			
Design Number Nine			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			

Design Number Ten			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			
Design Number Eleven			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			
Design Number Twelve			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			

Design Number Thirteen			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			
Design Number Fourteen			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			
Design Number Fifteen			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			

Design Number Sixteen			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			
Design Number Seventeen			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			
Design Number Eighteen			
Source of inspiration	Front View of the Design	Back View of the Design	Side View of the Design
			

RESEARCH RESULTS

Study Tools:

1. Questionnaire on the feasibility of using African sculpture art as a source for design and shaping on mannequins using fabric paste (for specialized experts):

- Psychometric properties of the questionnaire (questionnaire validation):

First: Questionnaire Validity:

1. Face Validity: The questionnaire in its initial form was presented to 11 specialized experts to provide their opinions regarding:

The linguistic accuracy and correctness of the statements, the ease and sufficiency of the statements to answer the research objectives, determining the adequacy of the number of statements to express their respective axis and their relevance or

irrelevance to it, the inclusion of statements that address the design elements and principles, the technical aspects of fabric pastes, and the innovative aspects of the design. Any statement could be rephrased, deleted, or new statements added for the questionnaire to meet its intended purpose.

In light of the specialized experts' opinions, the statements that achieved an agreement rate of 80% or more from their responses were approved. Some statements were rephrased according to the experts'

notes, and the questionnaire, in its final form, after modifications, consisted of (20) statements distributed over three axes: the first axis consists of 7 statements, the second axis consists of 6 statements, and the third axis consists of 7 statements.

2. Internal Consistency Validity of the Questionnaire: The internal consistency of the questionnaire for the specialized experts was verified by calculating the correlation coefficients between the questionnaire statements and the total questionnaire score:

Table (2) Correlation Coefficients Between the Scores of the Questionnaire Statements and Both the Total Questionnaire Score and the Score of their Respective Axis

Statement	Correlation Coefficient between the Statement and the Total Questionnaire Score	Correlation Coefficient between the Statement and the Axis Score	Statement	Correlation Coefficient between the Statement and the Total Questionnaire Score	Correlation Coefficient between the Statement and the Axis Score
1	**0.882	**0.897	11	**0.897	**0.901
2	**0.832	**0.876	12	**0.911	**0.931
3	**0.813	**0.843	13	**0.743	**0.832
4	**0.901	**0.923	14	**0.786	**0.876
5	**0.921	**0.943	15	**0.712	**0.865
6	**0.893	**0.899	16	**0.765	**0.812
7	**0.679	**0.788	17	**0.823	**0.890
8	**0.782	**0.863	18	**0.910	**0.936
9	**0.863	**0.897	19	**0.879	**0.887
10	**0.932	**0.945	20	**0.834	**0.856

** Significant at the (0.01) level

* Significant at the (0.05) level

Based on the previous table, the correlation coefficients between the statements and the total score of the questionnaire ranged between (0.932) and (0.679). The correlation coefficients between the statements and the score of the axis to which they belong ranged between (0.945) and (0.788), all of which are statistically significant at the 0.01 level.

Second: Questionnaire Reliability:

The researcher calculated the reliability of the questionnaire to verify its applicability using several methods (e.g., split-half and Cronbach's Alpha). This was done on a sample consisting of 11 specialized

experts, and the results were as follows:

1. The Cronbach's Alpha Coefficient: Based on Table (2), the reliability coefficients for each axis of the questionnaire ranged between (0.793) and (0.912), with the alpha coefficient for the entire questionnaire being (0.890).

2. The Split-half Coefficient (Spearman-Brown Correction Formula): Based on Table (2), the reliability coefficients for the axes ranged between (0.902) and (0.878), with the overall questionnaire reliability value being (0.952).

All coefficients indicate that the questionnaire meets a high degree of reliability, which indicates the validity of the scale for application.

Table (3) Reliability Coefficient Values for Each Axis of the Specialized Experts' Questionnaire

Axes	Number of statements	Cronbach's Alpha	Split-half (Spearman-Brown)
Design Elements and Principles	7	0.875	0.878
Technical Aspects of Fabric Pastes	6	0.912	0.902
The Innovative Aspect of the Design	7	0.793	0.891
The Questionnaire As A Whole	20	0.890	0.911

2. Questionnaire on the feasibility of using African sculpture art as a source for design and shaping on mannequins using fabric paste (for consumers):

- Psychometric properties of the questionnaire (questionnaire validation):

First: Questionnaire Validity:

1. Face Validity: The questionnaire in its initial form was presented to a group of 11 individuals to provide their opinions regarding:

The linguistic accuracy and correctness of the statements, the ease of the statements, and their sufficiency to answer the research objectives, determining the adequacy of the number of statements to achieve the intended purpose, with the possibility of deleting or modifying the wording of some statements or adding appropriate items for the questionnaire to meet its intended purpose.

Based on the individuals' opinions, statements

that received an agreement rate of 80% or more were retained, and the statements that were not agreed upon for linguistic and expressive accuracy were modified. Thus, the questionnaire in its final form, after all modifications, consisted of 11 statements.

3. Internal Consistency Validity of the Consumers' Questionnaire: The internal consistency of the consumers' questionnaire was verified by calculating the correlation coefficients between the statements and the overall questionnaire score:

Table (4) Correlation Coefficients Between the Questionnaire Statements and Both the Total Axis Score and the Total Questionnaire Score

Statements	Correlation Between the Statements and The Total Questionnaire Score	Statements	Correlation Between the Statements and The Total Questionnaire Score
1	**0.894	7	**0.890
2	**0.884	8	**0.954
3	**0.921	9	**0.889
4	**0.856	10	**0.956
5	**0.836	11	**0.874
6	**0.890		

**** Significant at the 0.01 level**

Based on the previous table, the correlation coefficients between the statements and the total questionnaire score ranged between (0.956), and (0.836), all of which are statistically significant at the 0.01 level.

Second: Questionnaire Reliability:

The researcher calculated the reliability coefficients of the questionnaire using several methods (e.g., split-half and Cronbach's Alpha). This questionnaire was presented to a sample of 11

individuals.

The results were as follows:

1. The Cronbach's Alpha Coefficient: Based on Table (), the reliability of the questionnaire as a whole is (0.976).

2. The Split-half Reliability Coefficient (Spearman-Brown Correction Formula): Based on Table (4), the reliability coefficient for the questionnaire is (0.988).

All of these coefficients indicate the validity of the questionnaire and its high reliability score, making it applicable to consumers to identify the best designs.

Table (5) Reliability Coefficient Values for Each Axis of the Consumers' Questionnaire

The Questionnaire As A Whole	Statements	Cronbach's Alpha Reliability Coefficient	Split-half Reliability Coefficient (Spearman-Brown)
	11	0.976	0.988

Statistical Processes:

The data were statistically processed using SPSS software to reach the results, and the statistical methods used are:

1. Pearson Correlation Coefficient: to calculate content validity (internal consistency) of the questionnaire.

2. Cronbach's Alpha Coefficient: to calculate the questionnaire's reliability. It is one of the most famous reliability coefficients as it depends on calculating the internal correlation of the responses to the items.

3. Weighted Mean and Weighted Percentile Mean: one of the best methods to identify the quality level of each item from the perspective of the assessors, and is used in Likert scale questionnaires.

The Weighted Response Scores for Each Statement in the Consumers' Questionnaire are as follows:

1.00 – 1.79 (Strongly Disagree)

1.80 – 2.59 (Disagree)

2.60 – 3.39 (Somewhat Agree)

3.40 – 4.19 (Agree)

4.20 – 5.00 (Strongly Agree)

The Weighted Response Scores for Each Statement in the Specialized Experts' Questionnaire are as follows:

1.00 – 1.67 (Not suitable)

1.68 – 2.35 (Somewhat suitable)

2.36 – 3.00 (Suitable)

4. Standard Deviation: to identify the extent of data dispersion from the arithmetic mean, and it also helps to determine the ranking of means when they are equal, where the best ranking is given to the statement with the lowest standard deviation.

5. One-Way ANOVA Test: is one of the tests used in the case of more than two independent samples.

This section addresses the applied results to determine the feasibility of using African sculpture art as a source for design and shaping on mannequins using fabric paste.

Table (6) The Weighted Mean, The Weighted Percentile Mean, The Standard Deviation, The Design Rankings, and Estimates According to The Responses of The Specialized Experts for All Axes:

Design	Indicator Levels			Total Weights	Weighted Mean	Standard Deviation	Weighted Percentile Mean (Quality Coefficient)	Design Rankings	Design Level
	Suitable	Somewhat Suitable	Not Suitable						
1	213	7	0	653	2.97	0.174	%99	2 nd	Suitable
2	193	27	0	633	2.88	0.331	%96	5 th	Suitable
3	201	19	0	641	2.91	0.292	%97	4 th	Suitable
4	207	13	0	647	2.94	0.242	%98	3 rd	Suitable
5	178	42	0	618	2.82	0.392	%94	6 th	Suitable
6	180	27	13	607	2.76	0.561	%92	8 th	Suitable
7	173	47	0	613	2.79	0.415	%93	7 th	Suitable
8	125	67	28	537	2.45	0.711	%81.7	16 th	Suitable
9	126	87	7	559	2.55	0.564	%85	15 th	Suitable
10	141	72	7	574	2.61	0.556	%87	13 th	Suitable
11	147	53	20	567	2.58	0.663	%86	14 th	Suitable
12	154	59	7	587	2.67	0.540	%89	11 th	Suitable
13	147	66	7	580	2.64	0.549	%88	12 th	Suitable
14	86	101	33	493	2.24	0.708	%74.7	18 th	Somewhat Suitable
15	113	54	53	500	2.27	0.839	%75.7	17 th	Somewhat Suitable
16	166	47	14	606	2.73	0.517	%91	9 th	Suitable
17	167	39	14	593	2.70	0.585	%90	10 th	Suitable
18	220	0	0	660	3	0	%100	1 st	Suitable

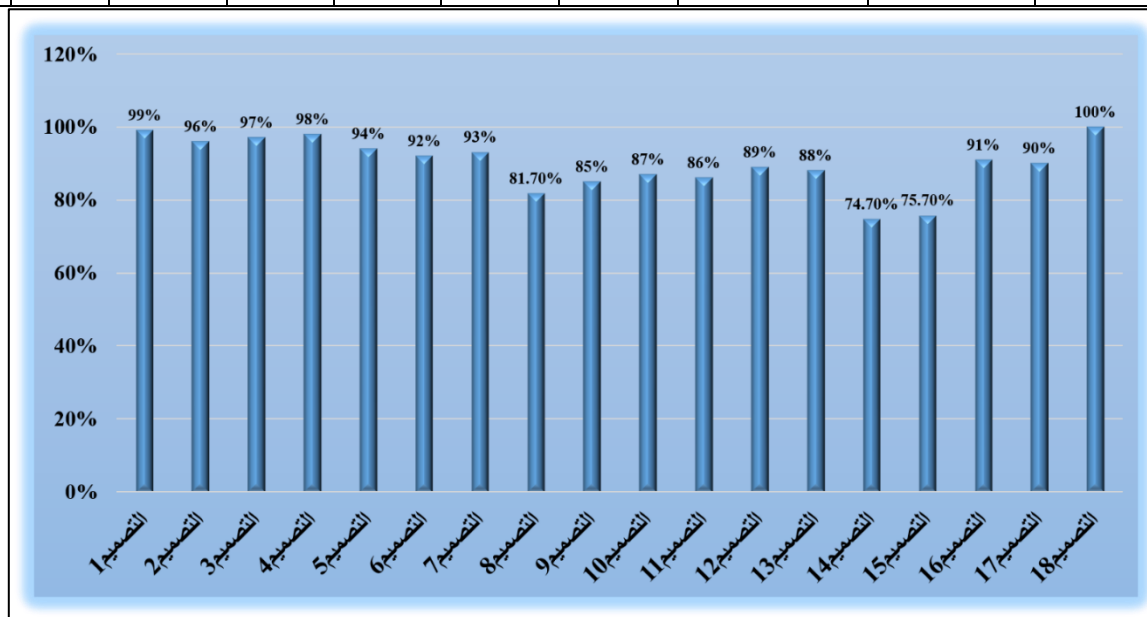


Figure (1) The Ranking of Designs According to the Responses of the Specialized Experts

Table (6) and Figure (1) show the opinions of specialized experts regarding the feasibility of using African sculpture art as a source for design and shaping on mannequins using fabric paste. It was found that 16 designs achieved a suitable level, and two designs achieved a somewhat suitable level. The best design was the eighteenth design, which ranked first with a weighted mean of (3) and a weighted percentile mean of (100%), followed by the first design, which ranked second with a weighted mean

of (2.97) and a weighted percentile mean of (99%), followed by the fourth design, which ranked third with a mean of (2.94) and a weighted percentile mean of (98%), followed by the third design, which ranked fourth with a mean of (2.91) and a weighted percentile mean of (97%), followed by the second design, which ranked fifth with a mean of (2.88) and a weighted percentile mean of (96%), followed by the fifth design, which ranked sixth with a mean of (2.82) and a weighted percentile mean of (94%).

Next is the seventh design, which ranked seventh with an average of (2.79) and a weighted percentile average of (93%), followed by the sixth design, which ranked eighth with an average of (2.76) and a weighted percentile average of (92%), followed by the sixteenth design, which ranked ninth with an average of (2.73) and a weighted percentile average of (91%), followed by the seventeenth design, which ranked tenth with an average of (2.70) and a weighted percentile average of (90%), followed by the twelfth design, which ranked eleventh with an average of (2.67) and a weighted percentile average of (89%), followed by the thirteenth design, which ranked twelfth with an average of (2.64) and a weighted percentile average of (88%), followed by the tenth design, which ranked thirteenth with an average of (2.61) and a weighted percentile average of (87%), followed by the eleventh design, which ranked fourteenth with an average of (2.58) and a

weighted percentile average of (86%), followed by the ninth design, which ranked fifteenth with an average of (2.55) and a weighted percentile average of (85%), followed by the eighth design, which ranked sixteenth with an average of (2.45) and a weighted percentile average of (81.7%), followed by the fifteenth design, which ranked seventeenth with an average of (2.27) and a weighted percentile average of (75.7%), followed by the fourteenth design, which ranked eighteenth with an average of (2.24) and a weighted percentile average of (74.7%).

Accordingly, the ranking of the proposed designs according to the specialized experts is as follows: the best designs (18, 1, 4, 3, 2, 5, 7, 6, 16, 17, 12, 13, 10, 11, 9, 8), which achieved an adequate level with percentages ranging between (100% to 81.70%), and the lowest are designs (15, 14), which achieved a somewhat adequate level with percentages of (75.7%, 74.7%).

Table (7) Analysis of Variance for the Study of the Significance of Differences Among Designs According to the Responses of the Specialized Experts for Each Axis of the Questionnaire and the Questionnaire as a Whole

Questionnaire Axes	Source of Variance	Degrees of Freedom	Sum of Squares	Mean Squares	F	Significance	Significance Level
Design Elements and Principles	Among Designs	17	274.449	16.144	1.204	0.265	Non-significant at(0.05)
	Within Designs	180	2414.364	13.413			
	Total	197	2688.813				
Technical Aspects of Fabric Pastes	Among Designs	17	323.818	19.048	2.129	0.008	Significant at (0.05)
	Within Designs	180	1610.182	8.945			
	Total	197	1934.000				
Innovative Aspects in the Design	Among Designs	17	890.909	52.406	3.494	0.000	Significant at (0.01)
	Within Designs	180	2699.455	14.997			
	Total	197	3590.364				
The Questionnaire as a Whole	Among Designs	17	3667.237	215.720	5.684	0.000	Significant at (0.01)
	Within Designs	180	6830.909	37.949			
	Total	197	10498.146				

Table (7) shows that:

- There are no statistically significant differences at the significance level (0.05) between the designs according to the specialized experts' opinions in the first axis (extent of meeting design elements and principles), where the F value reached 1.204 and the significance level was (0.265), which is greater than the significance level (0.05), indicating no differences among the designs in the extent of meeting design elements and principles. This indicates the efficiency of all designs in terms of meeting design elements and principles.
- There are statistically significant differences at the

significance level (0.01) between the designs according to the specialized experts' opinions in the second axis (technical aspects of fabric pastes), where the F value reached 2.129 and the significance level was (0.008), which is less than the significance level (0.01), indicating differences among the designs in terms of the technical aspects of fabric pastes.

- There are statistically significant differences at the significance level (0.01) between the designs according to the specialized experts' opinions in the second axis (achievement of the innovative aspects in the design), where the F value reached 3.494 and the significance level was (0.008), which

is less than the significance level (0.01), indicating differences among the designs in terms of the innovative aspects in the design.

- There are statistically significant differences at the significance level (0.01) among the designs according to the responses of the specialized

experts in the questionnaire as a whole, where the value of (F) reached 5.684 and the significance level was (0.000), which is less than the significance level (0.01), indicating the presence of significant differences among the designs in the questionnaire as a whole.

Table (8) The Results of the (LSD) Test for Multiple Comparisons Among the Designs Regarding the Questionnaire As A Whole.

Designs	Design1 M59.4 =	Design2 M57.5 =	Design3 M58.3 =	Design4 M58.8 =	Design5 M56.2 =	Design6 M55.2 =	Design7 M55.7 =	Design8 M48.8 =	Design9 M50.8 =	Design10 M52.2 =	Design 11	Design12 M53.4 =	Design13 M52.7 =	Design14 M44.8 =	Design15 M45.5 =	Design 16	Design 17
	Mean difference	Mean difference	Mean difference	Mean difference	Mean difference	Mean difference	Mean difference	Mean difference	Mean difference	Mean difference	Mean difference						
Design2	1.82																
Design3	1.09	0.73															
Design4	0.55	1.27	0.55														
Design5	3.18	1.36	2.09	2.64													
Design6	4.18	2.36	3.09	3.64	1												
Design7	3.64	1.82	2.55	3.09	0.45	0.55											
Design8	10.5 **5	8.73 *	9.45 **	**10	7.36 **	6.36 *	6.91 **										
Design9	8.55 **	6.73 **	7.45 **	**8	5.36 *	4.36	4.91	2.0 0									
Design10	7.18 **	5.36 *	6.09 *	6.64 *	4.00	3.00	3.55	3.3 6	1.3 6								
Design11	7.82 **	*6	6.73 *	7.27 **	4.64	3.64	4.18	2.7 3	0.7 3	0.6 4							
Design12	*6	4.18	4.91	5.45 *	2.82	1.82	2.36	4.5 5	2.5 5	1.1 8	1.82						
Design13	6.64 *	4.82	5.54 *	6.09 *	3.45	2.45	3.00	3.9 1	1.9 1	0.5 5	1.18	0.6 4					
Design14	14.5 **5	12.7 **3	13.4 **5	**14	11.3 **6	10.3 **6	10.9 **1	4.0 0	*6	7.3 **6	*6.73	8.5 **4	7.9 **1				
Design15	13.9 **1	12.0 **9	12.8 **2	13.3 **6	10.7 **3	9.73 **	10.2 **7	3.3 6	5.3 *6	6.7 *3	*6.09	7.9 **1	7.2 **7	0.64			
Design16	4.91	3.09	3.82	4.36	1.73	0.73	1.27	5.6 *4	3.6 4	2.2 7	2.91	1.0 9	1.7 3	9.64 **	**9		
Design17	5.45 *	3.64	4.36	4.91	2.27	1.27	1.82	5.0 9	3.0 9	1.7 3	2.36	0.5 5	1.1 8	9.09 **	8.45 **	0.55	
Design18	0.64	2.45	1.73	1.18	3.82	4.82	4.27	11. *18	9.1 **8	7.8 **2	*8.45 *	6.6 *4	7.2 **7	15.1 **8	14.5 **5	*5.55	*6.09

** Significant at the (0.01) level

* Significant at the (0.05) level

Table (9) The Weighted Mean, The Weighted Percentile Mean, The Standard Deviation, The Design Rankings, and Estimates According to The Responses of The Consumers for All Axes

Design	Indicator levels					Total weights	Weighted Mean	Standard Deviation	Weighted Percentile Mean (Quality Coefficient)	Design Rankings	Design Level
	Strongly Agree	Agree	Somewhat Agree	Disagree	Strongly Disagree						
1	154	11	0	0	0	814	4.93	0.258	98.6%	2 nd	Strongly Agree
2	143	22	0	0	0	803	4.87	0.352	97.4%	3 rd	Strongly Agree
3	132	0	33	0	0	759	4.60	0.828	92%	6 th	Strongly Agree
4	132	33	0	0	0	792	4.80	0.414	96%	4 th	Strongly Agree
5	132	22	11	0	0	781	4.73	0.594	94.6%	5 th	Strongly Agree
6	132	11	0	22	0	748	4.53	1.060	90.6%	7 th	Strongly Agree
7	99	44	22	0	0	737	4.47	0.743	89.4%	8 th	Strongly Agree
8	77	22	0	66	0	605	3.67	1.447	73.4%	18 th	Agree
9	66	55	44	0	0	682	4.13	0.834	82.6%	13 th	Agree
10	110	33	0	22	0	726	4.40	1.056	88%	9 th	Strongly Agree
11	110	11	11	33	0	693	4.20	1.265	84%	12 th	Strongly Agree
12	77	33	33	22	0	660	4.00	1.134	80%	15 th	Agree
13	77	44	0	44	0	649	3.93	1.280	78.6%	16 th	Agree
14	66	44	11	44	0	627	3.80	1.265	76%	17 th	Agree
15	77	55	0	33	0	671	4.07	1.163	81.4%	14 th	Agree
16	99	22	44	0	0	715	4.33	0.900	86.6%	10 th	Strongly Agree
17	88	44	22	11	0	704	4.27	0.961	85.4%	11 th	Strongly Agree
18	165	0	0	0	0	825	5.00	0	100%	1 st	Strongly Agree

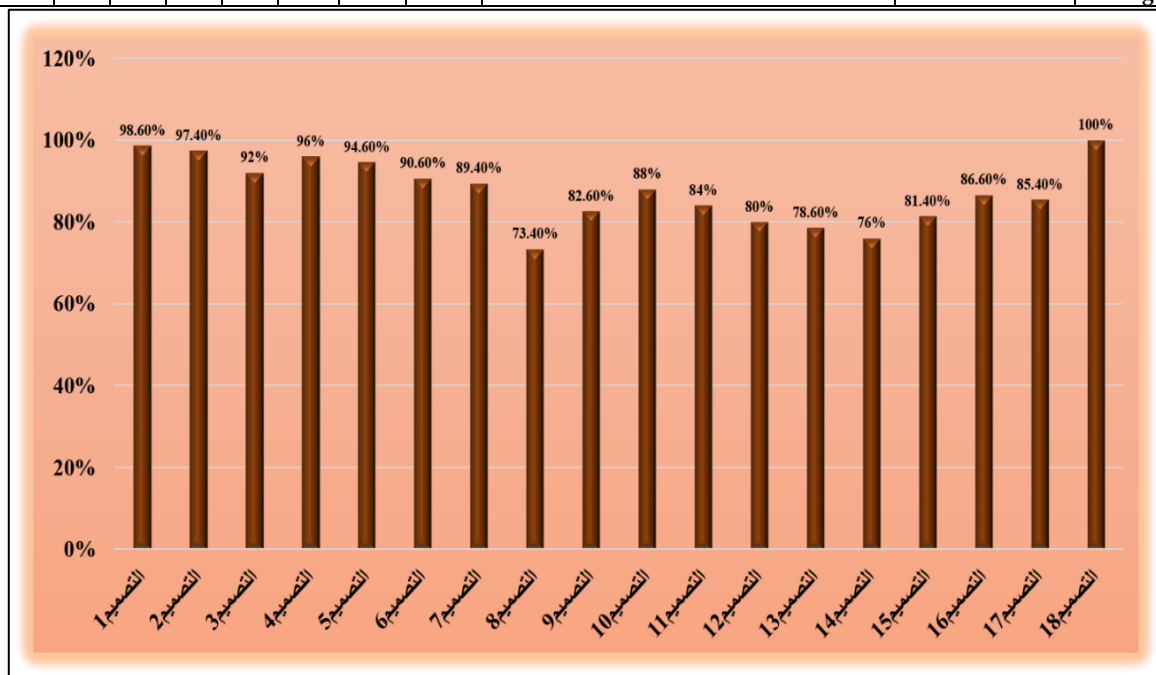


Figure (2) The Ranking of Designs According to the Responses of the Consumers'

Table (9) and Figure (2) illustrate the Consumers' opinions regarding the feasibility of using African sculpture art as a source for design and shaping on mannequins using fabric paste. It was found that 12 designs received a "Strongly Agree" level, and 6 designs received an "Agree" level. The best design was the eighteenth design, which ranked first with a weighted mean of (5) and a weighted percentile mean of (100%), followed by the first design, which ranked second with a weighted mean of (4.93) and a weighted percentile mean of (98.6%), then the second design ranked third with a mean of (4.87) and a weighted percentile mean of (97.4%), followed by the fourth design ranked fourth with a mean of (4.80) and a weighted percentile mean of (96%), then the fifth design ranked fifth with a mean of (4.73) and a weighted percentile mean of (94.6%), followed by the third design ranked sixth with a mean of (4.60) and a weighted percentile mean of (92%), then the sixth design ranked seventh with a mean of (4.53) and a weighted percentile mean of (90.6%), followed by the seventh design ranked eighth with a mean of (4.47) and a weighted percentile mean of (89.4%), then the tenth design ranked ninth with a mean of (4.40) and a weighted percentile mean of (88%).

Next is the sixteenth design, which ranked tenth with an average of (4.33) and a weighted percentage average of (86.6%), followed by the seventeenth design, which ranked eleventh with an average of (4.27) and a weighted percentage average of (85.4%),

followed by the eleventh design, which ranked twelfth with an average of (4.2) and a weighted percentage average of (84%), followed by the ninth design, which ranked thirteenth with an average of (4.13) and a weighted percentage average of (82.6%), followed by the fifteenth design, which ranked fourteenth with an average of (4.07) and a weighted percentage average of (81.4%), followed by the twelfth design, which ranked fifteenth with an average of (4) and a weighted percentage average of (80%), followed by the thirteenth design, which ranked sixteenth with an average of (3.93) and a weighted percentage average of (78.6%), followed by the fourteenth design, which ranked seventeenth with an average of (3.80) and a weighted percentage average of (76%), followed by the eighth design, which ranked eighteenth with an average of (3.67) and a weighted percentage average of (73.4%).

Accordingly, the ranking of the proposed designs according to consumers is as follows: the best designs are (18, 1, 2, 4, 5, 3, 6, 7, 10, 16, 17, 11), which received a "Strongly Agree" level with percentages ranging between (100% to 84%), and the lowest are the designs (9, 15, 12, 13, 14, 8), which received an "Agree" level with percentages of (82.6%, 73.4%).

Table (9) Analysis of Variance for Studying the Significance of Differences Between Designs According to Consumer Responses to the Questionnaire as a Whole

Table (10) Analysis of Variance for the Study of the Significance of Differences Among Designs According to the Responses of the Consumers for the Questionnaire as a Whole

Questionnaire Axes	Source of Variance	Degrees of Freedom	Sum of Squares	Mean Squares	F	Significance	Significance Level
The Questionnaire As A Whole	Among Designs	17	4906.774	288.634	2.652	0.001	Significant at (0.05)
	Within Designs	252	27426.67	108.836			
	Total	269	32333.441	-			

Table (10) shows that:

There are statistically significant differences at the significance level (0.01) among the designs according to consumers' responses in the questionnaire as a whole, where the F value reached 2.652, and the significance level was (0.001), which is less than the significance level (0.01), indicating the existence of significant differences among the designs in the questionnaire as a whole.

Interpretation of Results Related to Testing the Validity of the Study Hypotheses:

1. Results Related to the First Hypothesis of the Study and Its Implications:

"There are statistically significant differences among the designs according to the responses of the specialized experts in terms of the extent of meeting the design elements and principles, the technical

aspects of fabric pastes, and achieving the innovative aspects."

The Results Proved the Following:

- There are no differences among the designs in the extent of meeting the design elements and principles at a significance level of (0.05), indicating the efficiency of all designs in terms of achieving the elements and principles of design.
- There are differences among the designs in the technical aspects of fabric pastes at a significance level of (0.01), indicating the efficiency of all designs in terms of the technical aspects of fabric pastes.
- There are differences among the designs in the extent of achieving the innovative aspects at a significance level of (0.01), indicating the efficiency of all designs in terms of the innovative aspects.

- There are statistically significant differences at the significance level (0.01) among the designs according to the responses of the specialized experts in the questionnaire as a whole regarding "the feasibility of using African sculpture art as a source for design and shaping on mannequins using fabric paste" at the significance level (0.01).

2. Results Related to the Second Hypothesis of the Study and Its Implications:

"African sculptural art can be used as a source for design and shaping on mannequins using fabric paste according to the opinions of specialized experts."

The Results Proved the Following:

African sculptural art can be used as a source for design and shaping on mannequins using fabric paste from the perspective of the specialized experts, as it was shown that (16) designs achieved an appropriate level with weighted averages ranging between (5) and (2.45), and two designs achieved a somewhat appropriate level with averages ranging between (2.27) and (2.24). Therefore, the best proposed designs according to the specialized experts' opinions are designs (18, 1, 4, 3, 2, 5, 7, 6, 16, 17, 12, 13, 10, 11, 9, and 8), which achieved an appropriate level with percentages ranging from (100% to 81.70%), while the lowest were designs (15, and 14), which achieved a somewhat appropriate level with percentages (75.7%, 74.7%).

3. Results Related to the Third Hypothesis of the Study and Its Implications:

"There are statistically significant differences among designs created from African sculptural art and fabric paste according to consumer responses."

The Results Proved the Following:

- There are statistically significant differences at the significance level (0.01) among the designs according to the consumers' responses in the questionnaire as a whole, "The feasibility of using African sculptural art as a source for design and shaping on mannequins using fabric paste" at the significance level (0.01).

4. Results Related to the Fourth Hypothesis of the Study and Its Implications:

"African sculpture art can be used as a source for design and shaping on mannequins using fabric paste according to the opinions of the consumers."

The Results Proved the Following:

It is possible to use African sculpture art as a source for design and shaping on mannequins using fabric pastes from the consumers' point of view. It was found that 12 designs received a "strongly agree"

level with averages ranging between (5) and (4.20), and 6 designs received an "agree" level with averages ranging between (4.13) and (3.67). Accordingly, the proposed designs are ranked according to the consumers' opinions as follows: designs (18, 1, 2, 4, 5, 3, 6, 7, 10, 16, 17, and 11) which received a "strongly agree" level with percentages ranging between (100% to 84%), and the lowest were designs (9, 15, 12, 13, 14, and 8) which received an "agree" level with percentages (82.6%, 73.4%).

These results agree with the main findings of the study of (Rabab Hassan - ??), which included designing a group of proposals based on design lines that rely on the artistic features and formative elements of African masks, carrying a character of authenticity and modernity.

Likewise, the study of (Mervat Ahmed Abdel Ghani - 2021) has found that the technique in modern relief sculpture works became a fundamental element to achieve artistic ideas, with sculptors employing these techniques to highlight the aesthetics of the material.

In addition, the study of (Ihab Fad and others - 2021) has concluded that African heritage is a deep heritage with ancient roots; its study carries a special artistic character and unique identity that enriches research fields and applied artistic studies. African motifs, with their clear aesthetic values, enhance the overall value of design and have a stunning aesthetic impact when used, especially in the field of fashion design.

Similarly, the study of (Cecil Iskandar - 2013) confirmed that the more artistic and aesthetic values in the design product increase, the more creative it becomes.

Additionally, the study of (Asmaa Khattab - 2018) has stated that many contemporary artists were influenced by African art, and this art had clear imprints in their artworks. The integration of African art aesthetics with textile crafts had a significant impact on developing students' innovative abilities, in terms of their choice of techniques and textile compositions used in executing those crafts.

Likewise, the study of (Salama Ibrahim - 2007) has reported that cellulose pastes are suitable for three-dimensional sculptural modeling in the presence of a wireframe, which was one of the sculptural formations carried out by the researcher.

As well as the study of (Jumaa Abdel Jawad et al., 2014), which reached new and contemporary textiles inspired by the African mask.

COMMENTS ON THE RESULTS

1- Through training with fabric paste material, its characteristics, like roughness, smoothness, and

bright, shiny colors, as well as dark and pale colors, can be utilized. This creates relationships that provide opportunities to stimulate innovative thinking and reach designs with different and varied artistic values.

2- These characteristics are used to express dynamism and stillness as a response to the contrast of colors and textures of this material.

3- The combination of fabric paste and other materials leads to diversity in artistic values, color rhythms, and various aesthetics.

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Research Recommendations:

1. Providing art teachers with the artistic and technical knowledge related to fabric dough that suits all educational levels in the field of design and mannequin-based sculptural draping and decorative arts, which in turn helps develop their conceptual understanding.
2. Conducting further research on dough-based materials and the compatible materials that can be integrated with them, to develop new additions in the field of design and draping on the mannequin.

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