

# Impact of Origami techniques on Children's behavior as fashion Designs' consumers

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## 1. Abstract:

Visual art is a unique field as it has a capability for educating the society in diversity of perspectives. The two dimensions and three-dimensions art activities offer different art experiences, artistic skills, creative impact and critical thinking as they require different tasks and senses, during this activity(Andreass,2011), one of these arts is Origami which is one of the traditional handicrafts of Japan and is being recognized worldwide. Although its name is Japanese, similar traditions are observed worldwide. Origami has demonstrated the possibility of creating complex three-dimensional structures starting from two-dimensional patterns that are cut or folded into desired geometries through bending along predefined lines, Origami in Japan gradually became a popular hobby during the Edo period, approximately three hundred years ago. Japanese citizens have created a great variety of origami models since then from crane to roses (Yoshino, Matsuoka& Kishimoto, 2020, p. 1) (Huang, Elsayed, Franchin & Colombo,2020, p.1), also it has inspired fashion designers in more than one way. In recent years, fashion has turned to origami to find inspiration for creating geometric pieces that are futuristic, original, in addition to that origami has been shown to improve mental visualization skills using practical learning. These skills allow children to understand, describe, and construct their own imaginations of the world around them.

## Keywords:

Origami techniques , Children's behavior, fashion Designs

## الملخص:

يعد الفن المرئي مجالاً فريداً لأنه يمتلك القدرة على تثقيف المجتمع من منظور التنوع. تقدم الأنشطة الفنية ثنائية الأبعاد وثلاثية الأبعاد تجارب فنية مختلفة ومهارات فنية وتأثيراً إبداعياً وتفكيراً نقدياً لأنها تتطلب مهمة وحواس مختلفة خلال هذا النشاط خصوصاً الأطفال، حيث أن سلوك المستهلك للأطفال هو مجال تم الاهتمام به مؤخراً من خلال التسويق وعلم النفس وعلم الاجتماع وعلم التربية والسبب هو فهم أن الطفل جزء مهم له تأثير على تسوق الأسرة. خاصة تفاعلاته مع الفن وكيف يمكن تحويل نشاطه المحبوب إلى تصميم أزياء ، لذلك نختار في هذا البحث فنون الأوريغامي وهي فن طي الورق ، وهو مرتبط بالثقافة اليابانية. في الاستخدام الحديث ، تُستخدم كلمة "أوريغامي" كمصطلح شامل لجميع ممارسات الطي ، بغض النظر عن ثقافتهم الأصلية. الهدف هو تحويل ورقة مربعة مسطحة إلى منحوتة نهائية من خلال تقنية الطي والنحت دون استخدام القص أو الغراء أو العلامات على الورق. لفت هذا الفن القديم انتباه مصممي الأزياء لجمال وأصالة هذا الفن. حيث يبحث مصممو الأزياء دائماً عن اتجاهات وتقنيات جديدة يمكن تطبيقها على الملابس بشكل عام وملابس الأطفال بشكل

خاص ، لذلك يركز هذا البحث على كيفية الاستفادة من بعض تقنيات الأوريغامي التي تمثل ثقافة قديمة في جزأين وهما ، الاستفادة من المشاعر الفنية للأطفال في استخدام الأوريغامي كنشاط محبوب في قلوبهم وتوظيف أعمالهم الفنية الورقية لتصميم ملابس مناسبة للفئة العمرية ٤-١٠ سنوات. حيث تم تنفيذ أكثر من ٢٠ شكلاً من أشكال الأوريغامي بالأوراق الملونة من قبل الأطفال ، وتم استلهاً وتنفيذ سبعة تصميمات لمبسية لنفس ذات الأطفال وتم عمل جلسة تصويرية بأعمال الأوريغامي الخاصة بالأطفال محل الدراسة.

### الكلمات المفتاحية:

تقنيات الأوريغامي، سلوك الأطفال، تصميم الأزياء

**Research problem:** we can summarize the problem in the following questions:

- 1- What are origami techniques?
- 2- Do origami processes have got a role in enriching fashion design's creativity for children?
- 3- Is that possible to make a successful relationship between children's activity and fashion design?
- 4- Can fashion designer create an attractive fashion design inspired of children's work and make them feel satisfied?

**Aim of the research:** the focus is upon children as consumers of clothing and fashion. The study seeks to:

- 1- Examine the importance of different origami techniques as an interactive art and activity for children.
- 2- Converting children's origami activity into attractive fashion designs.
- 3- Break new ground in children's acknowledging to make them active participants and consumers.
- 4- Create fashion designs for children with the use of origami art.

**Research's importance:**

- 1- Explaining the role of origami in developing children's imagination and sense of color.
- 2- Helping children to experience objects by converting their origami to fashion design.
- 3- Developing the child's perception by practicing various origami techniques.
- 4- Creating a relation between children's activity and fashion design.

**Research's Methodology:**

- 1- Descriptive analysis methodology.
- 2- Applied methodology.

**Research limits:**

- 1- Creating children's clothing designs by using children's origami products for summer/spring 2020/2021.
- 2- Creating designs for Children under the age (4:10 years), measuring the extent of functional innovation and aesthetic design.

3- The practical work was applied to 1<sup>st</sup> grade students in faculty of applied arts Damietta University to create fashion designs for children who used origami art.

**Origami:** is an endlessly fascinating and rewarding art form. It combines sculpture, mathematics, and creative expression in a unique way. Although its roots and traditions go back as the inversion of paper, origami in the twenty-first century is exploding with creativity like never before, and it is finally coming into its own identification as a legitimate sculptural art form. (Szinger ,2014, p.1), Origami is also being well known as a tool for geometry education. The construction of a unit origami model is so easy, the creators of the origami models imagine the skeletal structures in 3D space and determine the final forms after deep consideration. Thus, this method could contribute to a new educational concept/practice as one of the practical educational methods.

**Origami folding types and techniques** Origami is a constantly evolving art, with origami artists creating ever-changing techniques that brings the art form to new levels of complexity and innovation: basic [origami techniques](#) are used to construct the models. This includes simple diagrams of basic folds like valley and mountain folds, pleats, reverse folds, squash folds, and sinks as shown in pic. (1). There are also standard named bases which are used in a wide variety of models, for instance the bird base is an intermediate stage in the construction of the flapping bird. Additional bases are the preliminary base (square base), fish base, water bomb base, and the frog base.



Pic. (1) some of origami folding types

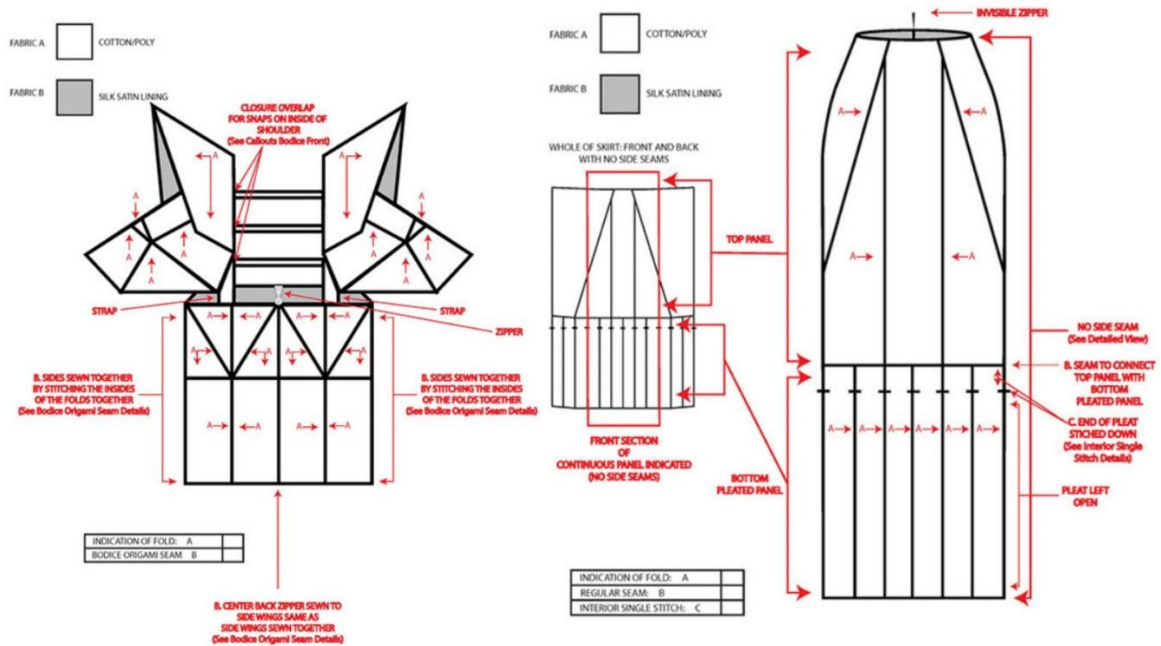
(<https://www.paperkawaii.com/origami-base-folds-for-beginners/>)

**Origami in fashion design:** Recently, origami has been considered as a new technology to construct three-dimensional objects using soft materials that have both the properties of softness and strength. (Yoshino, et al.,2020, p. 1) Pioneers of this art in costume design are Japanese designer Issey Miyake and British designer Charles James, they are “pioneers of introducing the concept of Origami” in fashion permanently through the use of certain technology on polyester fabric as shown in pic. (2). "Charles's designs contained beauty and artistic brilliance in particular, and he was looking for perfection in the production of unique designs. His designs were beautiful on the inside as they appear on the outside as shown in pic. (3). (Aldosairi & Abdel Rahman ,2019, p. 307)



Pic. (2) Issey Miyake origami fashion designs “1325

<https://www.pinterest.com/pin/552465079285859776/>



Pic. (3) Origami top and skirt by Charles James

<http://portfolios.pratt.edu/gallery>

**Origami techniques:** There are many kinds of origami with respect to folding, for example, there are flat origami, modular origami, wet origami, or tessellation origami. (Budinski ,2019, p. 2)

**Modular origami:** has the most of the same rules as traditional origami, but it comprises the folding of multiple pieces of paper into individual unites or modules, which are then assembles together to make a single model, generally without the use of any adhesives. Each unit is held to others strictly by the tension of the paper, and the resulting models can't be replaced with just a single piece of paper as shown in pic. (5). (Loper, 2016,p.10) Many of the modular origami models are decorative folding balls like kusudama, the technique differs though in that kusudama sometimes allows the pieces to be put together using thread or glue to form a sphere while Kusudama is the Japanese word that stands for “healing Sphere”, as KUSU means “healing herbs” and TAMA (DAMA)- a ball, spherical in shape, it is used generally to describe a “decorative paper ball” Chinese paper folding includes a style called Golden Venture Folding

where large numbers of pieces are put together to make elaborate models. It is most commonly known as "3D origami", however, that name did not appear until Joie Staff published a series of books titled "3D Origami", "More 3D Origami", and "More and More 3D Origami " as shown in pic. (4) (Katrin & shumakov, 2015, p.3)



Pic. (4) some examples of kusudama technique (Katrin & shumakov, 2015,p.6:7)



Pic. (5) 3D modular origami  
([www.pinterest.com](http://www.pinterest.com))

Petra Storrs made incredible paper dresses with intricate cut outs, shaping and folding the influence of paper folding in fashion re-emerges as fantasy clothing fashioned out of paper, Origami seems to be her main inspiration for these paper outfits. Petra Storrs has a thing for paper, as evidenced by her body of work. Among other things, she's created charming paper props for various photo shoots, her collection to be one of the most origami manifestations of the origami trend (El Melegy,2015, p. 9) which represent the modular origami type.



Pic.(6) Geomorfos by artist [Mauricio Velasquez Posada](#) 2010

There is another designer who was affected by the modular origami technique, these dresses were created by Uruguay based designers [Mercedes Arocena](#) and Lucia Benitez for their thesis project. During their research about generations of civilizations they discovered that most garments were built out of rectangles and squares. That led them to creating this line, "Nintai"-patience in Japanese, which utilizes geometrical figures as the basis of development for these [origami-inspired](#) dresses. Their collection uses the aspects of origami such as folding, creasing and building of the structures out of rectangles and patterns without the use of paper. As shown in pic. (7). (El Melegy,2015, p.7)



Pic. (7) Nintai: Origami-Inspired Geometric Dresses 2013 (El Melegy,2015, p.7)

**Wet- folding:** is a technique that involves slightly dampening the paper before making a fold. Wet-folding allows the paper to be manipulated more easily, resulting in finished origami models that have a rounder and more sculpted look as shown in pic. (9). The wet-folding technique. (McArthur ,2014, p. 14) The paper is dampened so it can be molded easily, the final model keeps its shape when it dries. It can be used, for instance, to produce very natural looking animal models, with an adhesive that is crisp and hard when dry, but dissolves in water when wet and becoming soft and flexible as shown in pic. (8).



Pic. (8) wet folding origami examples([www.shahrulazmi.com](http://www.shahrulazmi.com))



Pic. (9) the round and sculpted look

Fernando Sierra "Elvis" created outfits inspired by the costumes of the Bauhaus theater. The Exquisite work was published in the Venezuelan Plot of 2004, which represented the wet folding origami technique as shown in pic. (10)



Pic. (10) Elvis' fashion collection 2004 ([www.ohcolourmein.com](http://www.ohcolourmein.com))

**Pure land origami:** is a type of “pure” origami, in which no cutting, decorating, or using of glue, tape or scissors is allowed. Pure land origami allows only the use of simple mountain and valley folds as shown in pic. (11) (McArthur ,2014, p.14) all folds must have straightforward locations. It was developed by John Smith in the 1970s to help inexperienced folders or those with limited motor skills. Some designers also like the challenge of creating within the very strict constraints. ([https://en.wikipedia.org/wiki/Origami#cite\\_note-14](https://en.wikipedia.org/wiki/Origami#cite_note-14))



Pic. (11) pure land origami different shapes ([www.flickr.com](http://www.flickr.com)) (<https://medium.com>)

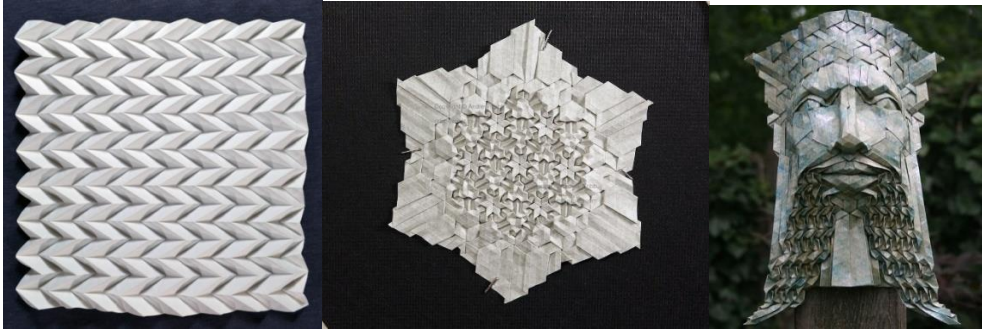
John Galliano had created his spring 2007 collection which was inspired of origami and he was interested in modular origami in one of his fabulous designs as shown in pic. (12)



Pic. (12) Christian Dior Couture Spring 2007 ([www.livingly.com](http://www.livingly.com))

**Origami tessellations:** is a flat-folding of a piece of paper based on a tessellation or tiling of the plan. One way to make this notion more precise is to consider the whole plane as the piece of paper and define a symmetric origami tessellation to be a flat-folding of the plane whose symmetry group is one of the 17 crystallographic groups. More generally, an origami tessellation might be defined to be any flat-folding of the infinite plane in which no bounded region of the plane contains all of the vertices of the crease pattern (at least) will necessarily form some kind of tiling. (Hull, 2002, p.8) In origami tessellations, pleats are used to connect molecules such as twist folds together in a repeating fashion. During the 1960s, Shuzo Fujimoto was the first to explore twist fold tessellations in any systematic way, coming up with dozens of patterns and establishing the genre in the origami mainstream. (<https://en.wikipedia.org/wiki/Origami>)





Pic. (13) different shapes of Origami tessellations ([cribbvisuals.photoshelter.com](http://cribbvisuals.photoshelter.com)) ([strictlypaper.com](http://strictlypaper.com))

Trinidadian architect [Tara Keens Douglas](#) presented a series of carnival costumes made from folded paper and twisted rope as part of her master thesis. The Ecstatic Spaces collection is based on the process of transformation that masqueraders experience at a carnival. The four costumes are described as four operations: appropriation, exaggeration, submersion and sublimation. As shown in pic. (14).



Pic. (14) Carnival costumes inspired of tessellation origami([www.dezeen.com](http://www.dezeen.com))

**Kirigami:** in traditional origami, a designer is folding papers, in Kirigami, designer folds and cuts paper. Cutting was often used in traditional Japanese origami, but modern innovations in techniques have made the use of cuts unnecessary. Most modern origami designers no longer consider models with cuts to be origami. Most modern books don't even mention cutting. As shown in pic. (15)(Lang, Robert J., 2003).



Pic. (15) examples of the traditional Kirigami origami

The paper artist Asya Kozina inspired her collection of her fascination by Mongolian wedding costumes. They themselves are very extravagant and futuristic, so the designer had created her own version of these outfits exaggeration with white paper, she emphasized their shapes and cuttings, colors, and unnecessary details as shown in pic. (16) ([www.behance.net](http://www.behance.net))

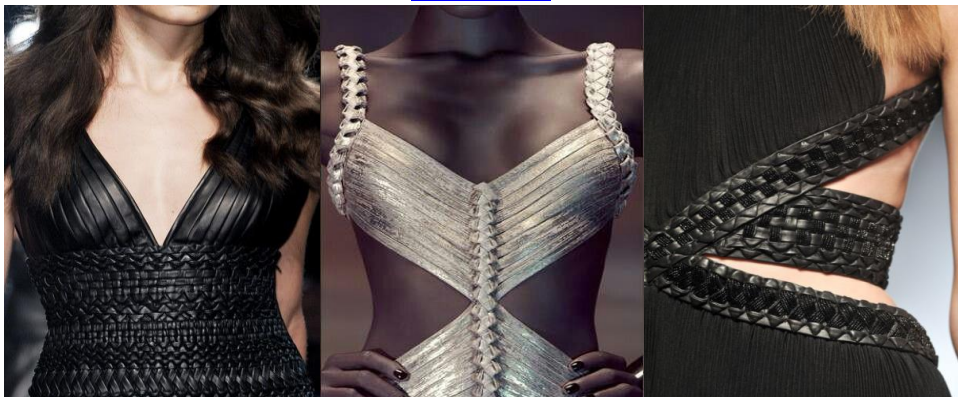


Pic. (16) Asya Kozina's collection inspired of Kirgami origami ([www.behance.net](http://www.behance.net))

**Strip folding:** Strip folding is a combination of paper folding and paper weaving, a common example of strip folding is called the Lucky Star, also called Chinese lucky star, dream star, wishing star, or simply origami star. Another common fold is the Moravian Star which is made by strip folding in 3-dimensional design to include 16 spikes. as shown in pic. (17)



Pic. (17) different examples of strip folding origami. (<https://www.origami-resource-center.com/strip-folding.html>)



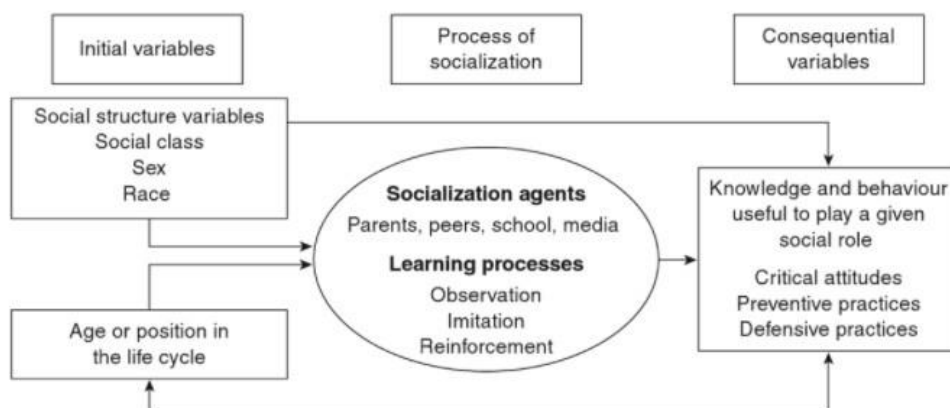
Pic. (18) examples for the strip folding fashion designs([www.pinterest.co.kr](http://www.pinterest.co.kr))

**The effect of origami art on children:** Origami is an art which can capture the child eyes. Because The meaning of any “art” for the child is to be seen as primarily a means of expression. All children are different and as an individual, he or she changes ages, grows and has increased perception, understanding and interpreting the environment within which he/she lives. Art then, for the child is a language to express dynamic changes in thoughts. It follows then that art education which is overly concerned with thoughts, feelings, perceptions and reactions within a given environment (society/culture). (Abdullah,1994, p. 57), children are capable of exploring the foundation of origami paper folding techniques, the folding technique experience will enhance children fine motor skills as well as develop the coordination ability as shown in pic. (19), only the precise folding technique will create an exquisite origami artwork that can enrich an aesthetic value. Consequently, the children need to think critically about how to apply the suitable folding technique to construct the intended sculptural form. (Abdul Jamil,et al ,2018)



Pic. (19) some children’s origami activity

**Children as a customer:** the social role model theory suggests that a child is supposed to learn how to play different roles in society as pupil, sibling, grandson, as well as consumer, the economic education is achieved in practice owing to four main sources of information: parents and family habits, peers, advertising and the products themselves. The inclusion of social roles emphasized the importance of social environment on children’s cognitive elaborations, it considered the influences of parents and peers as well as the effect of gender as the main factors that help children to become active economic agents – able to choose a product, learn how to buy it, and understand how the marketplace is being governed. (Marshall,2010, p. 29)



Shape (1) consumer socialization process (Marshall, 2010, p. 29)

## The Factors of product appealing by Children:

- **Aesthetics:** An adult's sense of aesthetics can be categorized as a general theory of beauty. This will be representative of the common use of the expression as a sense of visual satisfaction. Likewise, a child's sense of aesthetic quality can be categorized as a theory of sensual recognition and experiences. This is because children find it harder to identify objects by the looks of it, simply because they know less about its context or function. This is why children have to rely on several sensual impressions to get a grasp of the attractiveness of a certain object. Touch and taste are often as important in this phase as the pure visual impression. These impressions will build up a knowledge of a certain object's attributes, which later on can be distinguished by simply recognizing the looks of it. This is a knowledge that adults have previously built up using the same way, which is why they are able to often gather the needed information from a product just by looking at it. ( Tvedt,2016,P. 3)

To give a better understanding, Alexander von Baumgarten's three dimensions of aesthetics from "Aesthetica" (1750) can be used: (Guyer - 2016)

1. Aesthetics as general theory of beauty
2. Aesthetics as philosophy of art
3. Aesthetics as theory of sensual recognition and experience

- **Emotional Appeal:** represents a psychological, social or symbolic desire that motivates consumers to purchase the product because of the feelings it elicits. (Kin, Jen & Lee, 2020 – P.3) The appeal of a product is very subjective, as appeal is made up from a group of a product's attributes such as how attractive, sympathetic, pleasant, motivating, desirable and inviting it is. Since children will experience the appeal of something based on their own perception of these attributes, provoking the same reactions from adults will be a challenge. A product can however be appealing for the adult through the reactions of the child. If the child loves a product, the parent is more likely to be happy with it as for the relationship between a physical object and a child, hence triggering positive emotions and a sense of appeal. (Tvedt,2016, P. 3)

- **Affordance:** First it was developed in 1979 by James Gibson 'affordances' denotes a transactional relationship between perceiver and their environment, indicated by what an environment affords the perceiver. (Arlinasari, Cushing,2018, p.95) Gibson argued that environments consist of affordances, defined as activity possibilities, as the primary objects of human's perception. That is why individuals perceive the environment regarding what behavior it affords (i.e. a tree affords climbing, a door affords opening, a chair affords sitting). Furthermore, the activities are guided by how a person detects or perceives information, often visual cues, that specifies what the environment affords that Developmental Affordances - An Approach to Designing Child-friendly Environment. However, an affordance exists relative to the action capabilities of the perceiver, the perceiver also must pick up "self-information" (or assessment about his own capabilities) to respond to the information provided by the environment: "If perception of the environment is co-perception of the self, then information that specifies the environment also specifies the self, or the actor's position in the environment. If the environment affords some action for the perceiver, it is in relation to the perceiver's action capabilities." (Tudge et al. – 1997 - p. 82)

**The following are the design ideas for applying origami in children's clothing:** The applied study was based on creation of 7 clothing designs inspired of origami shapes for children under the age of 4-10 years, by combination of the following:

**1. Child interactive activity:** creating a relationship between fashion design pieces and the children work, in addition to benefit from their sensory perception and artistic interaction, by helping them understand the different types of origami and making origami pieces of shapes close to their heart by using colored papers according to their choices and in different sizes. As shown in Pic (20), (21).

**2. Origami conversion to fashion:** employing the art of origami which the children created of colored papers to fashion designs in accordance with the requirements of the child in the mentioned age group. Many thanks for the 1<sup>st</sup> grade students at faculty of applied arts Damietta University for their inspiration of the child's work and convert it to a suitable fashion design under the researchers' supervision.

So, we make a combination between fashion design and the child's aesthetics rules which help him/her to recognize the shape, create it and love it, this makes him/her feels that he/she helped the designer in creating his/her outfit it with his own hands. These may make a love condition between the child and his outfit, in addition to making an interactive photo session - like an origami playground - with children's origami paper pieces to enjoy their work as shown in pic. (22)



Pic. (20) the children's origami activity

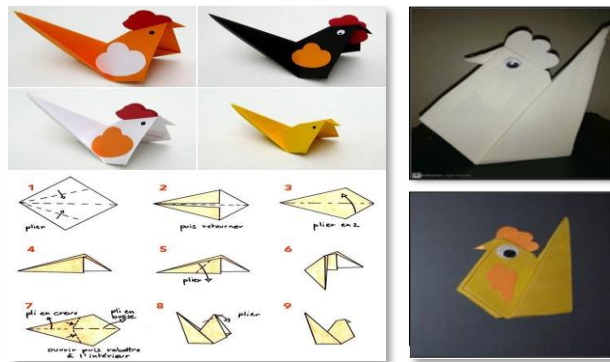


Pic. (21) Photo session backgrounds



Pic. (22) Kids' interaction with the origami pieces they made with their own hands

**First design:** Pure land origami was used in the implementation of the rooster origami made by a six years old girl as shown in pic. (23)



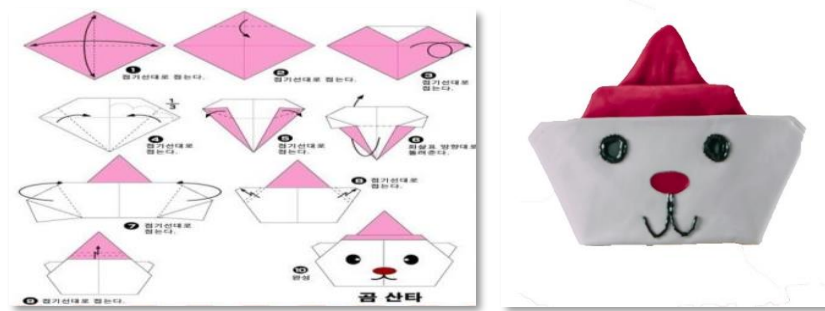
Pic.(23) Steps to implement origami rooster

**Design description:** The design is a cloche dress reaches the knee line with a cut slightly above the waist line, off shoulder sleeves, Rosaline fabric was used which is flexible, comfortable and not sticking to the body. As shown in pic. (24), **Design colors:** canary yellow and orange colors, **Fabric:** Rosaline fabric.



Pic. (24) Pure land origami “rooster” inspired dress

**Second design:** Pure land origami was used in the implementation of the Cartoon face made by a nine years old girl, as shown in pic. (25)



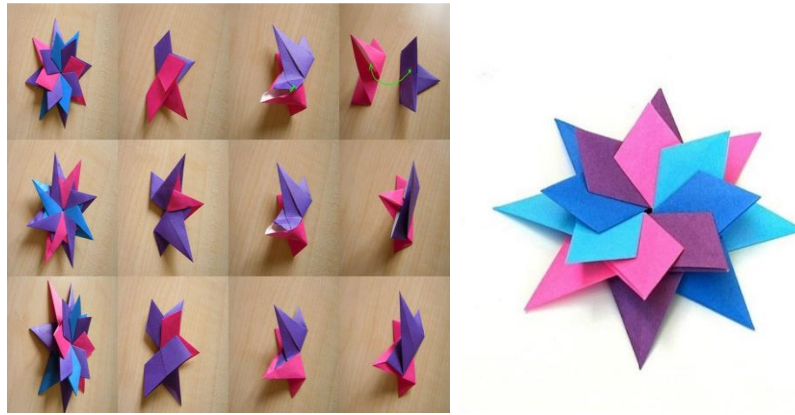
Pic. (25) Steps of origami “cartoon face” implementation

**Design Description:** The design is a half sleeve cloche dress reaches the knee line with a waist cut with be It and circular aperture neck, with three tulle layers of ruffles, **Colors:** Light rose color, dark red color (maroon), **Fabric:** Rosaline and tulle, the addition of the tulle material in the form of multiple ruffle layers raises the admiration of girls in this age group. As shown in pic. (26)



Pic. (26) Pure land origami “cartoon face” inspired fashion design

**Third Design:** modular origami was used in the implementation of star and Strip folding origami was used in the implementation of overlapping ribbons, made by ten years old girl. As shown in pic. (27)



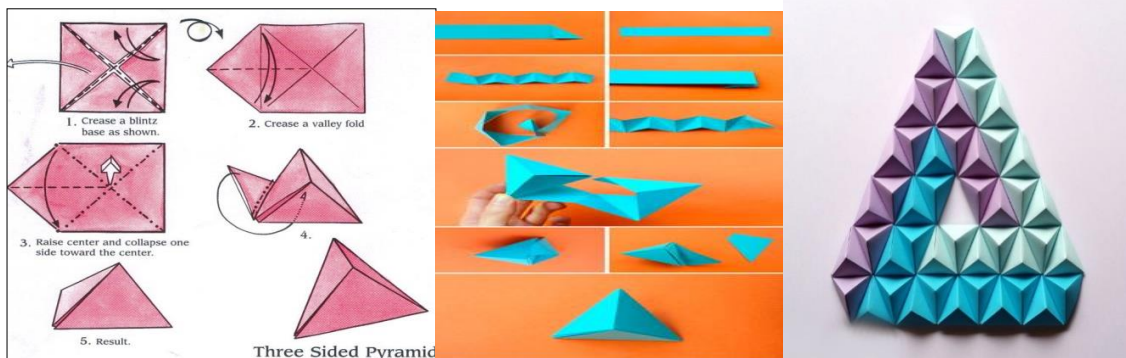
Pic. (27) Steps of origami star implementation

**Design Description:** a round neckline, pleated dress above the knee, with waist cut in the form of a belt. with a star origami pieces on shoulders and waist, overlapping ribbons on the back, **Color:** baby blue color, **Fabric:** Mixed gabardine (Lycra Cotton) is one of the quick materials in absorbing sweat away. As shown in pic. (28)



Pic. (28) Modular and strip folding origami inspired Fashion design

**Fourth Design:** Strip folding origami used in the implementation of three-sided adjacent pyramids made by a four years old baby girl by our help. As shown in pic. (29)



Pic. (29) Steps of origami “three-sided adjacent pyramids” implementation



**Design Description:** sleeveless dress with a baby collar, the dress reaches the knee line, **Color:** dark red color (maroon), **Fabric:** Rosaline fabric are used. The idea of origami is three-sided adjacent pyramids in maroon, rose and canary yellow.



Pic. (30) Strip folding origami inspired fashion design

**Fifth design:** tessellations origami was used in the implementation of the TR cutting made by a 10 years old girl with our help. As shown in pic. (31)



Pic. (31) Steps of tessellation origami implementation

**Design Description:** a sleeveless, cloche dress reaches to knee with wide pleated belt, the upper part is a crossed over, **Color:** off white, greenish grey, **Fabrics:** satin, organza and printed satin.



Pic. (32) tessellations origami “TR cutting” implemented on the back

**Sixth design:** Pure land origami was used in the implementation of the tulip flower, made by (eight- and nine) years old girls. As shown in pic. (33)



Pic. (33) Steps of pure land origami “Tulip” implementation

**Design Description [pic. (34)]:** a sleeveless, round neckline, cloche dress with waist cut and belt, with two tulip origamis on skirt, **Colors:** blue, fuchsia and green, **Fabric:** Linen.

**Design Description [Pic. (35)]:** a sleeveless, round neckline, cloche dress with waist cut, its length reaches to the knee with more than six tulips on skirts. **Colors:** rose and white which chosen to stimulate the interest and attention of children at this age. **Fabrics:** satin.



Pic. (34) pure land origami “Tulip” inspired fashion design



Pic. (35) Pure land origami “Tulip” inspired fashion design

### • Research Results:

1. Origami can function as a stimulus for children as a consumer, it represents something new that is attractive.
2. Origami can help children to develop logic, artistic and esthetic sensibility.
3. Child's ability increases as a consumer by establishing a relationship between his artistic activities and fashion design.
4. Increase children's interaction while wearing the created fashion designs due to converting the photo session to a playground of origami made by their own hands.
5. The Origami art has been shown to have positive behavioral and cognitive impacts on children, as they have a calmer and friendlier attitude after making origami forms. It is empowering when children are able to create something out of nothing but plain paper, then seeing these forms on their clothes, this fills their heart with courage, self-esteem, a feeling of achievements

• **Research recommendations:**

1. All specialists must pay attention to the study of the child's mental and artistic activity and how to use that in fashion design.
2. The importance of exploiting creative energies in transforming children's artistic ideas into creative fashion designs.
3. All specialists must study the child's way of thinking to convert his ability from a normal child to a consumer who can take his own decision.

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