
Implementing Non-Repetitive Designs on Upholstery Fabrics

Soniya Avazpour^a, Loghman Karimi^{b*}, Salar Zohoori^c

^aArt and Architecture Department, Yazd Branch, Islamic Azad University, Yazd, Iran

^bDepartment of Textile Engineering, Science and Research Branch, Islamic Azad University, Tehran, Iran

^cDepartment of Textile Engineering, Yazd Branch, Islamic Azad University, Yazd, Iran

Received 4 February 2017; revised 29 April 2017; accepted 1 May 2017

Abstract

In this study, a new method has been introduced for the production of upholstery fabric, with a single design feature such as designs without repetition of color features to avoid uniformity in the furniture. In this regard, single fabric design with colors appropriate to sofa structure is considered. The aim is to study the different upholstery fabrics and to reach the starting point for upholstery fabric design. The design can provide feeling of relaxation and comfort for human beings. In today's stressful life, humans are concerned with the need to see and touch elegance and simplicity in their surroundings, despite the lack of diversity in upholstery fabric design that cannot fulfill their wishes. Therefore, designs need to be consistent with the theme so that they are integrated in the field and lead the viewer's sight to the surrounding, as if the design is ongoing.

Keywords: Furniture; Upholstery; Design; Fabric

1. Introduction

1.1. Furniture Design

Furniture is made to sit and rest and to make a loving home environment. Generally, furniture (like sofa) consists of objects that are used in the house or to decorate the house; they are made of wood, metal or soft metals and are covered with colored fabrics such as leather or plastics (Dehkhoda Dictionary). Basically, furniture creates a loving home atmosphere; it is a term derived from the French word "Ameublement", and in Persian language the first letter "A" is eliminated and replaced by correct word "equipment" (Kasraei, 2007: 60).

* Corresponding author. Tel: +98-9144422952; fax: +98-2188009611.

E-mail address: l.karimi@srbiau.ac.ir.

Furniture, with respect to the quality of design, can limit the physical comfort or development. Our body reacts to the comfortability of a chair or to the height of a chair. Therefore, human is an important factor affecting the form, proportion and scale of the furniture. Furniture must be designed in a way that in the first place it is associated with human dimensions (Mahmudi, 2007: 304).

The initial layout of the room is the living room furniture that must have a natural color and shades, decorated with colorful fabrics to suit the environment and commensurate with the taste of people. Furniture is categorized as the design elements that take place entirely with the interior design, while the walls, floors, ceiling, windows and doors are concerned with architectural design. In the interior design, the selection and arrangement of portable elements, furniture and other accessories with a building space are important.

Furniture is the mediating element between human and architecture. It provides a nature of change in the form and scale between interior space and people. A habitable interior space is created by the furniture.

Nowadays, many of the furniture designs are the combination of different pieces of historic and contemporary periods. There is a lack of research on the historical interior design by most designers, although these rooms are an appropriate case to be considered for designing as they maintain furniture and historical accessories, and at the same time preserve the antiques for the customer. Historical and cultural resources provide the examples of furniture arrangement and selection of appropriate projection and furniture pieces. Among the primitive designs that have been produced till date, most of the reproductions lack the quality of the original material, construction skills or the durability of their originality. The antiques are often recognized by cultural or historical aspects, countries and or important people of each period. The original pieces are usually expensive if the appearance condition is favorable (Cordella & Hidalgo, 2016).

Modern furnishings include pieces produced in the late 19th century and early 20th century designed by designers and craftsmen belonging to Bauhaus movement. The physical comfort can be restricted or developed depending on the furniture quality of design. Our body will react to the height of the chair. There are certain types of feedback that make us aware for the suitability of the furniture to be used. Therefore, human is an important factor that has an impact on the form, proportion and scale of the furniture. Furniture must be designed in a way that initially it is related to human dimensions, to favorable responses and also to the provision of movement patterns and the nature of the activities. However, our understanding depends upon the nature of things or ongoing activities. The duration of the environmental factors such as lighting quality and our mental state also effects the perception. Sometimes, the effectiveness and efficiency of furniture depends on the proper use of furniture or the level of our knowledge about their application (Mahmudi, 2007: 304).

1.2. Original Furniture Style

American – English classic design style: Styles and forms that have survived and remained over the centuries are known as classic. Recent furniture is still the same as it was earlier created to serve people's needs. All time furniture designs are new and up-to-date. In fact, a good furniture layout is permanent (Kasraie, 2007: 64).

Chippendale Style: Thomas Chippendale lived from 1720 – 1775 in UK and from 1750 – 1770 was an eminent cabinet maker of London. During his career, he was interested in furniture and ventured in the preparation of projects in the field of furniture. Over time, with the introduction of Mahogany wood in the profession of carpentry, Chippendale presented patterns that were in

compliance with this new wood; that was the beginning of popularity and transformation in furniture design, which was later recognized as Chippendale style. Thomas Chippendale worked exclusively on fine carvings and avoided inlay work. The right baseline was considered as the most important features of Chippendale furniture style (Justis, 2011).

Jacobean Style: This is an English furniture style formed from 1603 – 1688. The Oak chair with a long backrest, delicate carved legs, with Spanish velvet covered seater introduced proportion and lines of the furniture. From the primary Jacobean soft seater, emerged furniture with Stewart style fabric cover. The glory and elegance of the style was the result of advance in carpentry by Grinling Gibbons.

Queen Style: In the Queen era, the home furniture took distance from the carving style and specification which was the passed introduction. This was the first English furniture style where there was a combination of both beauty and comfort. The armrest and back of the furniture was appropriate for the body curvature. The cloth covering replaced the carving with curvy lion claw base, and rounded corners emerged in this style. The luxurious high backrest style was shortened. It was during this period that Mahogany wood was used for the first time in UK. In chairs of Queen Anne style, the backrest was indented or flat and with non-removable fixed fabric coated seats.

Classic French Style: This style was popular during the reigns of Louis XV and Louis XVI. The royal furniture makers filled the king's palace with furniture of the 18th century. Louis XV made the ancestors' love for the luxury objects.

Neoclassical: From the late 17th century till the mid-18th century the neoclassical furniture included the Federal and Empire styles. The passion for ancient style and imitation of Greek designs was inspired by excavation of Pompeii. The fathers of the Independent America saw the early democracy of the human history as their new republic model and believed that classic design must reflect the new United States. Very soon, the Americans showed their pride by filling the revival Greek style buildings with neoclassical furniture. This era of peace was perhaps the rise of Nationalism in several European countries and the furniture reflected the state of introspection of that period (Kasraie, 2007: 71).

Duncan Phyfe Style (1768 – 1874): Duncan Phyfe was born in Scotland but was the first furniture designer in America. His early work reflected the Adam and Sheraton style. Phyfe designs have been predicted with balance, building stability and economic aspects. His designs are characterized as using a grip shape as backrest recessed, and raised cylindrical carving on the base and hand-rest, brass network base, leaf carvings and projected curvature style are seen at the base of chairs and tables.

American Simple: The rural furniture is not specified through the furniture maker or through one period, but it represents the ordinary people's way of life. This simple furniture was manufactured in America from the colonial days until the appearance of machine-made furniture in the mid-19th century. Unlike "great style" furniture that was made by skilled craftsmen, the village furniture was made by un-trained carpenters or those who were self-trained. These carpenters with limited talent mixed the available materials and supplied types of furniture to the rural areas. The result was that the rural furniture had a strong and unique function. Nevertheless, these were identified as handmade furniture that included a range of styles built by primitive dwellers and partly skilled village carpenters (Kasraie, 2007: 76).

Classic Victorian Era: The furniture of mid-19th century (1850) till the end of 19th century was famous as the Victorian style, but in fact, this was the era of diversity and elite-oriented movement. The furniture was influenced by three different factors which are revival of the past styles, reaction to machine age and innovation in materials and technology.

Contemporary Style, Modern: The contemporary style similar to their ancestors began with a few talented people. However, the creators of the 20th century furniture were the architects and designers instead of furniture makers and carpenters. These new waves of craftsmen were trained in the Bauhaus. Bauhaus was a German Art school established in 1919. The students of the art school, with the slogan “form follows function”, learnt to use the concept of good design in the requirement of mass commercial production and the need for the homes of post-industrial age. The resulting furniture was simple and geometrical, showing fearless machine-made production (Kasraie, 2007: 76).

2. Types of Upholstery Fabric

The structure of this type of fabric is divided into six types of design;

2.1. Arabesque Design

The word ‘arabesque’ specifically refers to the original Iranian design in which curves and rotary motions of stem, leaves and flowers are used. The combination of these curves creates a complex and eye-catching design. This type of design is usually formed with single or mixed varieties of flowers. The stem movement is beautifully intertwined, giving glory to the fabric. Usually these designs are used in Jacobean and semi-Jacobean furniture; the floral patterns are divided into two categories as follows,

a) Mixed and elegant flowers are woven with a variety of high quality yarns, and special carving is used for high quality sofas. It is clear that the combination of the cloths is done with a beautiful design, high quality Jacobean sofa, and dense carving with a suitable color providing an ideal sofa set.

b) A pattern of simple flowers with dispersed composition which usually consists of flower stems repeated from left to right or crosswise on the entire fabric for comfortable sofas. The quality of yarn in this type of cloth is lower than the densely work cloth (Matin, 2005: 41). This type of design has a curved structure and floral motifs. The structure of the design is often of different spirals and uses different flowers like Shah-Abbasi, rose, narcissus and tulips (Hashemi, 2005: 39).

2.2. Geometric Design

The designs are mostly geometric shapes and structures. This type of structure does not have the same softness and smoothness as arabesque designs. It has cubism and a deformed statue that is mostly suitable for complete comfortable furniture fabrics, usually in the living room (Hashemi, 2005: 39). The meaning of geometry here is the design without curvature, composition of straight and diagonal lines and simple-geometric shapes like squares, triangles, etc. The quality of yarn is ordinary and often bowstring in three colors. Sometimes, more graceful tiny flowers are used among these patterns (Matin, 2005: 43).

2.3. Integrated Design

The integrated design is the combination of arabesque and geometric designs, and one can say that it is more modernized and has broken the past classic designs and is suitable for comfortable and semi-Jacobean furniture (Hashemi, 2005: 40). The integrated design is patterns made with arabesque and geometric designs; each of the geometry and arabesque elements should have an accurate proportion close to each other, not only to maximize the appeal but also to create beautiful

and psychological compositions. Geometric and arabesque designs are two separate issues and their composition must be done with great skills. This type of upholstery fabric is often used in comfortable and semi-Jacobean furniture and rarely in Jacobean furniture (Matin, 2005: 45).

2.4. Fantasy Design

This is a special and limited structure, specially used for children's room upholstery. The motifs of these designs are moon, stars, and lively artificial or real flowers. This design style has high functionality in printing industry, but it is less functional in jacquard industry (Hashemi, 2005: 40). In terms of design, this fabric is more specific than the others. Other designs are not usual and have lots of variations. Indeed, it is an innovation in the upholstery fabric design which is usually due to the taste of the designer. These fabrics are abstract and unusual; for example, the design may use cubism painting style. They are often used for comfortable furniture fabrics; of course, these types are relatively heavier and more expensive (Matin, 2005: 47).

2.5. Actual Design

The structure of these designs are photography; it means that the same things that we see in nature, home, work area and so on is designed in the same manner without any modification to the extent that the woven fabric is the same as the photograph. The composition is not very much considered, but a standard and good photograph will provide the fabric with a better design (Hashemi, 2005: 40).

2.6. Picture Design (Frame)

This is more modern type than the previous five structure (Hashemi, 2005: 40). Currently, innovations on upholstery fabric design can be seen as the images of humans and animals in the landscape. The images of this upholstery fabric are called picture motifs seen in different forms divided into two main groups (Matin, 2005: 49).

a) Image frame design: This design has an oval frame. The frame consists of different pictures such as flower bouquet, vases, human figures (reliefs of Persepolis) (Matin, 2005: 49). In the fabric, fine and elegant design are used as background which is according to the taste of designer associated with the role inside the frame. The frame may have intertwined branches of flowers, curved forms etc. In such cases, the frame completely separates the inside design from the background. The second way is that the design does not have a frame and the design could be a bouquet of flower, but which is known as frame design. The name of picture frame design on these types of design are not necessarily associated with the frame but it means single design on the background (Matin, 2005: 49).

In the design that does not have frame around usually the main design background has been integrated with the entire fabric background. This type of fabric is used in Jacobean furniture. As the number of fabric cut pieces, one frame is on the backrest of the furniture and the other frame is on the furniture seat. Of course, the seat frame maybe entirely eliminated and replaced by background design of the fabric (Matin, 2005: 49).

Due to the quality of the fabric, fine yarns are used for the production and it is considered as high quality fabric. Their frame layout changes on the basis of daily style. The design maybe composed of several colors or the design is apparent by super three colors weft with different texture. This fabric may not be used, Chanel weft and only filament weft with high density is used for the

production. Finally, this fabric is of higher quality and more expensive than the other upholstery fabrics (Matin, 2005: 49).

b) Motifs of landscape image: This fabric is not unlike other fabric size and in furniture and dining service that includes three person sofas, four single sofas, two host chair and few dining chair from six seaters to ... dining table. According to the number of dining table seat, a single cut piece of fabric is used for each chair for example, a three person sofa a frame width of 1.6 meter is used (Matin, 2005: 49).

3. Upholstery Fabric Material Survey

Usually, the upholstery fabric material are of jacquard fabrics woven by jacquard machine, and for the production purpose usually yarns such as polyester, super bright, Chanel, cotton, viscose are used or their combination. The design of these fabrics are completely innovative or imitate or a combination of both (Ahmadzade, 2007: 21). The fabric material should be selected in such a way to resist the normal corrosion while using the fabric. Textiles rated commercial have the resistant label on it against the fire-resistant, sun and corrosion caused by the use of fabric.

The materials that come under this category are:

Cotton: This is a plant fiber with low elasticity and combustibility and with high wrinkle property.

Linen (Flax fiber): This fiber is derived from flax stalk that has high strength and stability, fragile and wrinkle easily and it is more resistant to mold than cotton.

Rami plant fiber: This is a natural fiber and very strong with striking effect that is brittle and not elastic. The fiber is often used in combination with linen and cotton.

Silk: This is produced by silk worms and it is the most powerful natural fiber. This fiber is resistant against the solvents but rotten in sunlight.

Rayon: A substance that is made from wood pulp. Rayon favorably gets mixed with other fibers and also gets well colored.

Acetate: Fibers or woven plastic fibers are made from cellulose acetate and has low elasticity and rigidity. It is well drape with fabric and wrinkles easily.

Triacetate: Triacetate is a form of cellulose acetate which consists of three groups of acetate for each monomer of glucose. Monomers are molecules that can join other similar molecules to form a polymer. Monomer has good elasticity, resistant to abrasion and has high stability with permanent wrinkles.

Acrylic: The material is like silk or wool which can be easily colored and may create fluff easily.

Hybrid Resins (or Vinyl): This is like leather or suede (felt type) and it is easy to clean.

Polyester: Polyester is resistant to wrinkle, abrasion and folding, it is stable in dimension. This is prepared in two ways using slash fibers and extended fibers. In slash fibers (or cut fibers), the fiber surface is smooth and has circular cut and it is produced in gloss, semi-gloss and matt finishes. According to the stability it is similar to Nylon and at standard condition it absorbs 4% of moisture (Nylon at standard condition absorbs 7% of moisture). Polyester is resistant to temperature, wrinkles, abrasion, folding and dimensional stability (Ahmadzade, 2007: 101).

Many polyester are similar to polyamides and both these are produced by melt spinning and stretching of linear condensation polymer methods. Under heat treatment it begins to lower the resistant against tearing and the ability to absorb moisture is adequate (Ahmadzade, 2007: 101).

Polymer fiber (Elastomeric): The textile is rubber-like which has the ability to return to their original shape (elasticity) (Mahmudi, 2007: 311).

The fibers mentioned are used in the production of knitted fabric, woven and non-woven fabrics. But most of the productions are woven fabrics.

4. Process and Design Implementation without Repetition

According to the principles of composition for upholstery design contrast, movement, proportion and rhythm can be seen. So that the furnishing designs have appropriate shape and color and repeated design can be seen in the fabric. The monotony and fatigue of these repetitions has been fixed with the creation of contrast. The contrast causes the mobility, attractiveness and diversity on the fabric. The upholstery fabric composition must use the properties of contrast, shapes and colors. The movement in the fabric brings excitement and attractiveness. The rhythm is created through spaces between the design and placement position relative to each other. In other words, rhythm is the pace of movement. In fact, rhythm is the kind of movement. The focal point is that the eye focuses on the shape, color and parts of the forms that has brightness and darkness in the design that at times fuses with the background and has visual diversity.

The distinguishing feature of this fabric design is the whiteness and brightness of the design and allows part of the design to be vacant, as these activities are sub-consciously in our mind which is incomplete. If it was not like this than it would be an uniform furniture.

After preparing the design related to the target weaving area, the design is ready for weaving. It should be noted that any color of the fabric in an area has its own characteristics. The fabric is designed with regard to the designer recognition to the actual appearance of the texture in fabric and the created shading and brightness for the fabric. In this design collection, an attempt has been made to maintain the values so that the audience can easily connect with them to gain sense of peace and satisfaction.

There were six designs for the upholstery fabric. Initially, the fabric design and its implication on the furniture were conducted through the software. Each design has been shown separately below:

4.1. Final Design

Design 1: This design is done using grid which shows softness and movement, the floral patterns on the lattice are clear and at times invisible. The background design is separated with black lines. While the design has ongoing white background and displays the back lines with other colors indicating the mobility and dynamics.

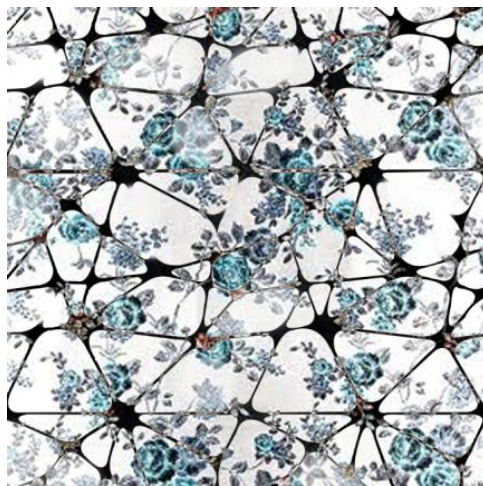


Fig 1 Design 1

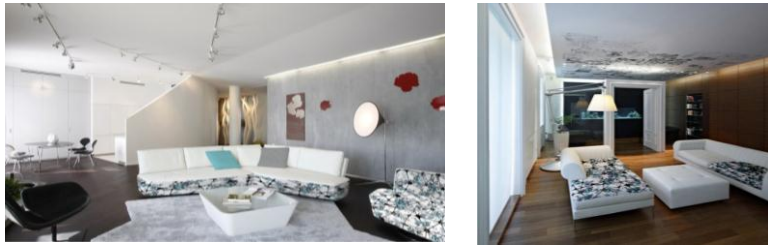


Fig 2 Final implementation of design 1

Design 2: The design has been prepared using colors with spring designs, so that they are moving towards brightness. The use of diamond lines is the advancement with interruption giving us the feeling that the flowers and the design is ongoing and has reached the peak.



Fig 3 Design 2



Fig 4 Final implementation of design 2

Design 3: This pattern is designed within the squares with the presence of contrast and color difference causing the movement of squares. At places when the design fades but the viewers' mind is still moving on the white background in search for the design.



Fig 5 Design 3

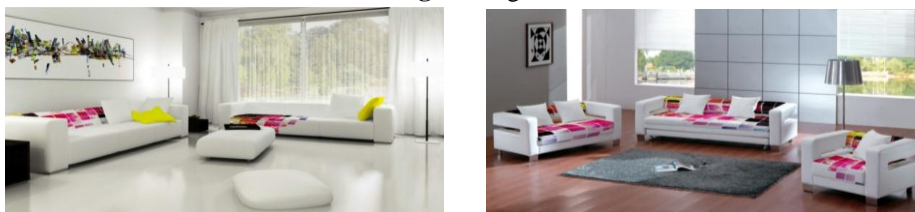


Fig 6 Final implementation of design 3

Design 4: In this design, features of the previous design are considered. The difference is that the design within the squares is closer to each other which depict winter and this sense is induced with the use of colors. Despite the presence of cool colors it shows the trend of movement and spring has been shown with the dispersion of squares and color difference.



Fig 7 Design 4



Fig 8 Final implementation of design 4

Design 5: The design is made with diagonal square color contrast and sometimes combination of squares together and at times disappearance of some squares depicting the design mobility. White background with spontaneous spots has created a bubble shape which gives a particular interest to the design.



Fig 9 Design 5

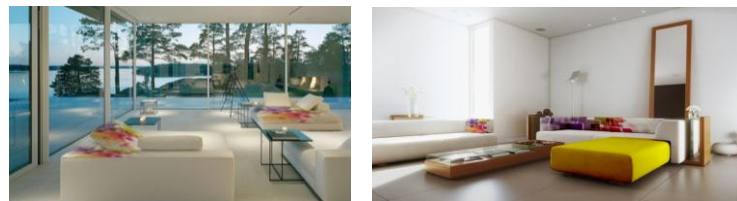


Fig 10 Final implementation of design 5

Design 6: The design is rectangular shape with color difference, brightness and darkness has allocated the previous characteristic of the design for example, disappearance. Eye observing the complete design when comes across the disappeared square sub-consciously seeks to find where this rectangle is completed; this causes movement and gives attractiveness to the design.



Fig 11 Design 6



Fig 12 Final implementation of design 6

5. Conclusion

According to the previous discussion and implementing of furniture designs, it can be concluded that in addition to the possibility of the lack of repetition on fabrics upholstery, these designs supply the human needs. Thus, in this article upholstery fabrics are designed with non-repetition characteristic and been a single design. Because upholstery fabrics, due to the comfort and simplicity for human need deals with the repetition and this consequently loses its attractiveness and the design been not appealing and the viewer sees the design repetition.

6. Recommendation

With regard to the upholstery, fabrics are fixed on the furniture framework. It is recommended that it increases the resistant and strength so that it has sufficient strength against scratches. The other complementary process to improve the efficiency of the fabric is to resist the absorption of moisture (moisture absorption causes infection).

References

- Ching, F. (2007). *Space, design and arrangement in interior architecture* (R. Kurosh Mahmudi., & Ahmadinezhad, Tans.). ShahrAshub Publisher, Tehran.
- Cordella, M., & Hidalgo, C. (2016). Analysis of key environmental areas in the design and labelling of furniture products: Application of a screening approach based on a literature review of LCA studies. *Sustainable Production and Consumption*, 8, 64-77.
- Dekhoda. (2000). *Persian dictionary*.
- E, Ford, J. (2007). *Characteristic of textile fiber* (A. Mohammadreza., & M. Mirjalili, Trans.). Islamic Azad University Yazd Publisher, Yazd.
- Innovative Catalyst Institute. (2007). *Zinc Oxide*. Furozesh Publisher, Tabriz, First edition.
- Justis, E. J. (2011). Handmade: Chippendale breakfront. *The Journal of Hand Surgery*, 36(6), 1068-1069.
- Kasraei, F. (2005). *Forty terminology in interior architecture of house*. Sanobar Press, Janzadeh Publisher, Tehran.
- Noori motalagh, Z. (2012). To study the efficiency of photocatalyst nano particle ZnO process on the colorization of Mythelene Blue and eliminating COD from synthetic drainage system. Elmi-Pejoheshi seasonal, Ulum-Pezeshghi, Lorestan.