

## **Creating sustainable fashion designs for women inspired by “Mondrian” paintings**

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### **Abstract**

Many fashion designers have pursued the principle of sustainability to provide clothes that meet consumer's needs and aim to make the major benefits of clothing product and change the wearer's practices in ways to wear and improve the pattern of rapid consumption of less consumption. Transformable clothing is one of the applications of sustainability in fashion design, which can be comfortably worn in multiple ways. It can be transformed into another shape and able to transform back to the original shape by altering its components. The standards of convertible fashion design are flexibility, mobility and adaptability. The standards of transformable clothes are flexibility, mobility and adaptability. Using the modular design system as one of the types of transformable clothes, more than one dress style can be obtained for one clothing product using modules that can be added or removed to the clothing design and inspired by the abstract geometric thought of Mondrian.

The present research aims to create fashion designs for women in the age group (18-25 years) inspired by the abstract geometric thought of the artist Mondrian with a new vision as an application of the theory of sustainability using the modular design system, which can be obtained from more than one style to wear for basic design using remove and/or add modular units, and implement them with appropriate implementation techniques.

The findings indicate that modular design allows wearers customize the garment into any possible combinations by modifying the modules, so various styles are created from the main design, thus the researchers created three proposed designs. Each design consists of the main design and numbers of modules which can be remove and/or added by using appropriate fasteners.

### **Key words:**

Modular design system, Mondrian, sustainability, fashion design.

**الملخص**

اتجه العديد من مصممي الأزياء وبيوت الأزياء العالمية بتطبيق مبدأ الاستدامة لتوفير ملابس تلبى احتياجات المستهلك وتهدف للاستفادة القصوى من المنتج الملبسي، وتعمل على تغيير الممارسات الملبسية في طرق الارتداء وتحسين نمط الاستهلاك السريع لاستهلاك أقل والحد من استنفاد الموارد عن طريق تغيير سلوك المستهلك وثقافة الشراء.

تعد الملابس التحويلية أحد تطبيقات الاستدامة في مجال تصميم الأزياء، حيث يمكن ارتداؤها بشكل مريح بطرق متعددة، وتحويلها من شكل إلى شكل آخر ثم العودة إلى الشكل الأصلي عن طريق تغيير مكوناتها. فإن معايير تصميم الملابس التحويلية هي المرونة والقدرة على الحركة والقدرة على التكيف وتوفير متطلبات المستهلك. وباستخدام نظام تصميم الوحدات كأحد أنواع الملابس التحويلية يمكن الحصول على أكثر من نمط ملبسي لمنتج ملبسي واحد باستخدام الوحدات التي يمكن إضافتها أو إزالتها للتصميم الملبسي للحصول على شكل مختلف والمستوحاة من الفكر التجريدي الهندسي للفنان "موندريان".

يهدف البحث الحالي إلى ابتكار تصميمات ملبسية للنساء في المرحلة العمرية (18-25 سنة) مستوحاة من الفكر التجريدي الهندسي للفنان موندريان برؤية جديدة يراعى فيها الشكل الجمالي وتحسن من دورة حياة المنتج كتطبيق لنظرية الاستدامة باستخدام نظام تصميم الوحدات، والذي يمكن الحصول من خلاله على أكثر من نمط للارتداء للتصميم الأساسي باستخدام الوحدات القابلة للإضافة والإزالة، وتنفيذها بتقنيات التنفيذ المناسبة ومراعاة سياسيات التصميم والاتجاهات العالمية.

تشير النتائج إلى أن نظام تصميم الوحدات يسمح لمرتيبه بتكوين النمط الخاص به عن طريق التحكم في اضافة أو ازالة الوحدات الخاصة بالتصميم وتجميعها في النمط المناسب، بحيث يتم إنشاء أنماط مختلفة من التصميم الرئيسي، وبالتالي قام الباحثون بابتكار ثلاثة تصميمات مقترحة، بحيث يتكون كل تصميم من التصميم الرئيسي وعدد من الوحدات التي يمكن إزالتها أو إضافتها باستخدام الموثقات المناسبة.

**الكلمات المفتاحية:**

نظام تصميم الوحدات، "موندريان"، الاستدامة، تصميم الأزياء.

**1- Introduction:**

Many garment brands seek to change consumer buying behavior, encourage them to become aware of the concept of sustainability in fashion, and strive to satisfy consumers no matter what the requirements and desires [1]. It is described as a garment that is simply worn in many ways and patterns. It is transformed into another form and can be restored to its original form by changing its parts [2]. From transformable clothes such as a type consists of clothing that can be rearranged or combined with other parts of an object through a modular design. In other words, transformable clothes standards are the flexibility and ability to motion and adaptability is targeted to genre research lastly to provide clothes that meet the needs of women using the modular design system to get more than one style in one product using modular units which can be added or removed according to vertical and horizontal lines in Mondrian paintings by using appropriate fastenings.

### **1-1 Definition of Sustainability:**

Sustainability is a term that means the ability to sustain and to endure over time Sustainable development as the development model that allows us to meet present needs, without compromising the ability of future generations to meet their own needs. [3]

### **1-2 Modular design system:**

In terms of clothing, modular is a dressing system that contains several detachable small components. Each component can be adjusted independently and separately without affecting other components. This system can maximize the possibility of each garment by rearranging or transforming components into different combinations. It implements the highest flexibility and versatility of garments among the existing types of transformable designs. In order to meet the individual styles and preferences of wearers, modular design allows wearers customization of the garment into any possible combinations by modifying the modules. This conceptual framework of adjustable clothing offers a wider range of wardrobe options and gives an infinite number of creations to a garment.

Modular system has been widely applied to fashion garments and accessories. In recent years, fastenings such as zippers, snap buttons, etc. are more often to use for connecting each component to allow its rearrangement. There are two kinds of modular system, one is garment panels based modular system and the other one is Lego-like modular system ,many fashion designers propose a new attitude towards sustainable fashion such as Rad Hourani and Flavia la Rocca in their collection. [4]

### **1-3 Fashion designers who have adopted the modular design system in their collections:**

#### **1-3-1 Flavia la Rocca:**

Italian designer Flavia Larocca makes modular garments by which users can create different types of looks [5], to create a never-ending wardrobe. To reduce the waste of water, energy and raw materials, bearing in mind the importance of protecting our planet [6]. Flavia la Rocca's concept is to propose a new attitude towards clothing. A contemporary and modern way to dress up, starting from style matter, having the possibility to change the outfit and customize the pieces with a very simple action, saving time and space. Entire collections are built on modular concept. The clothes are composed of interchangeable modules that, through the use of hidden zippers, can be detached and matched again to create different combinations. Modules from different seasons can be mixed together to create a never-ending wardrobe. The design is based on bold and geometric lines with feminine attitude, a dialogue among seasonal perspectives and a timeless but also modern and functional designs. [7]



Figure (1)  
Flavia La Rocca modular collection 2016. [7]

### 1-3-2 Rad Hourani:

Rad Hourani was born in Jordan in 1982. Raised in Canada, he has started to do styling since 2001. His namesake brand ‘Rad Hourani’ was founded in 2007 and was based in Paris. Rad Hourani is best known for his transformable and unisex design that has no conventional restrictions: asexual perspective. In Rad Hourani’s transformational aspect, new silhouettes and materials are explored through experiments, and zippers are used in unusual ways to permit particular shapes of transformation. Such as black and white jacket Collection by Rad Hourani, spring/summer 2011 figure (2). [8]



Figure (2)  
Collection by Rad Hourani, spring/summer 2011. [9]

### 1-4 Piet Mondrian (1872-1944):

Piet Mondrian pioneered the de Stijl movement that emerged in the early 20<sup>th</sup> century. The movement marked an important evolution in the history of art from an earlier focus on abstraction and Cubism. <sup>[10]</sup>

Mondrian carried the paintings through various stages in which, at first he turned the elements into uniform planes colored in muted versions of the primaries. He separated the planes so that they seemed to float against a white background, but concluding that this effect was still too “natural”, then connected the planes in a regular grid covering either a rectangular or a diamond format. In the next phase the artist made them larger and unequal in size and colored them in the primal color states; red, yellow, and blue- and primal non-color states; black, white, and grey. Mondrian’s planes were structural, determinate, and active. <sup>[11]</sup>

### 2. Material and methods:

Modular systems embrace the concept of “minimum inventory and maximum diversity”, in which the design is subdivided into a number of modules that can be independently combined in a variety of configurations to drive multiple functions or create different styles. <sup>[12]</sup>

The present research tended to use the modular design system in creating three proposed designs. Each design consists of the main design and numbers of modules which can be removed and/or added by using appropriate fasteners, so three different styles are created from the main design. The proposed designs were inspired by Mondrian’s paintings which depends on planes in a grid. They are unequal in size and colored by the primal color states; red, yellow, and blue, and primal non-color states; black, white, and grey. Adobe illustrator program was used to assist in creation, modification, optimization, and coloring the proposed designs.

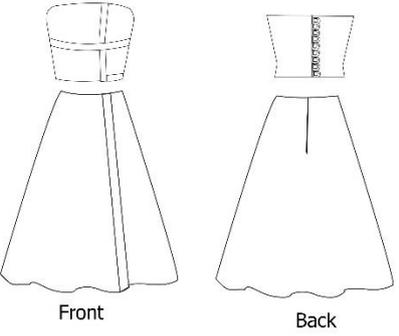
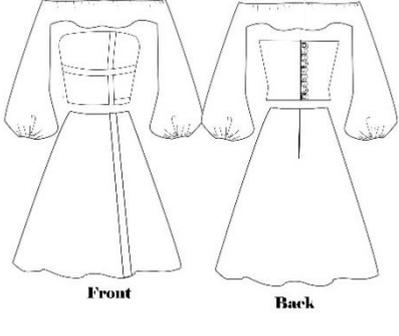
The researchers used a tailored method in implementing the proposed designs by using body measurements in size (small). Satin and chiffon fabrics were used in implementing the designs. Zippers, snaps, and buttons were used to remove and/or add modules to the main design.

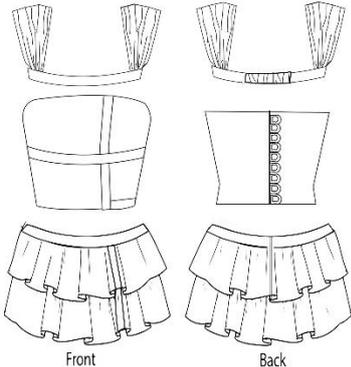
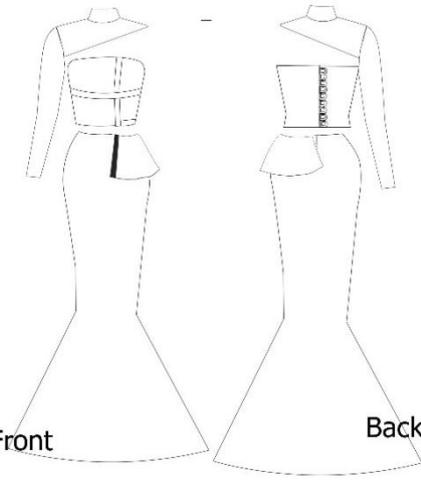
### 3. Results:

The designs were presented in an appropriate layout, which consist of inspiration source, the proposed design, technical design, and the implemented design, as follows:

#### Design (1)



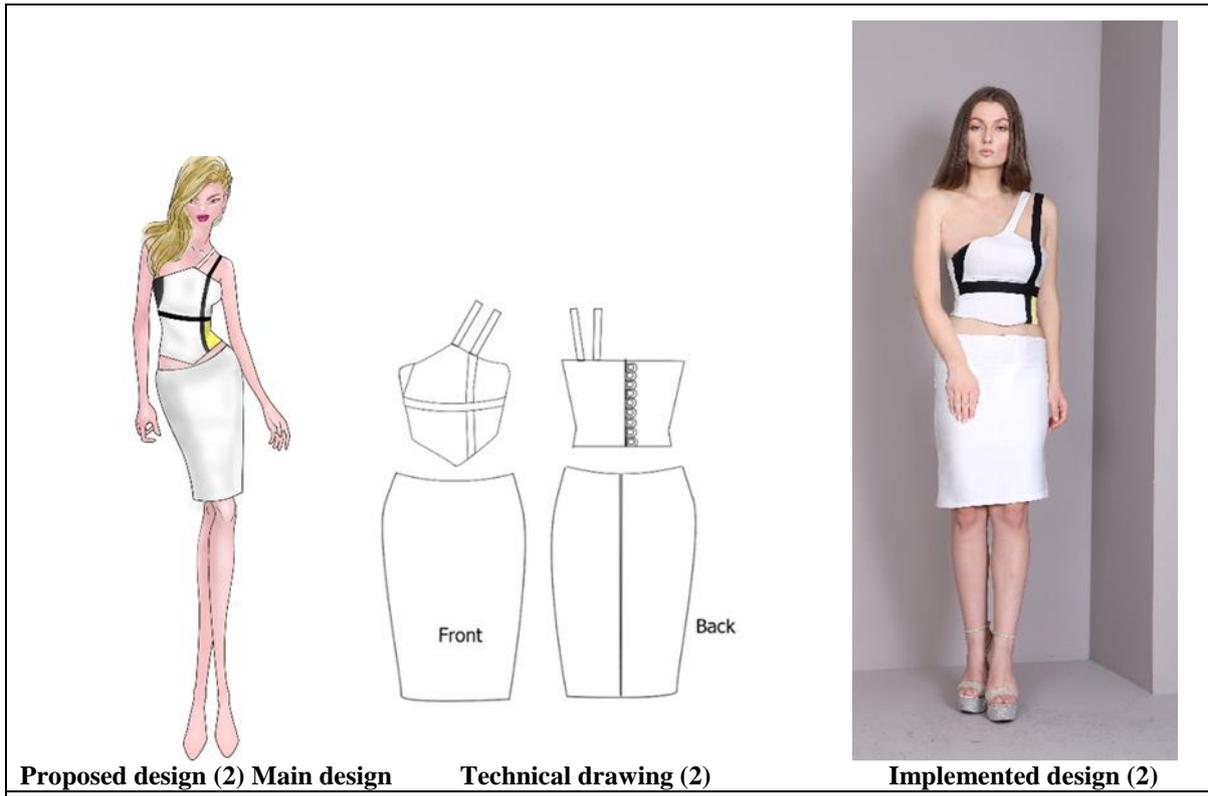
	 <p style="text-align: center;">Front                      Back</p>	
<p style="text-align: center;"><b>Proposed design (1)</b> <b>Main design</b></p>	<p style="text-align: center;"><b>Technical drawing (1)</b></p>	<p style="text-align: center;"><b>Implemented design (1)</b></p>
	 <p style="text-align: center;">Front                      Back</p>	
<p style="text-align: center;"><b>Proposed design (1-A)</b></p>	<p style="text-align: center;"><b>Technical drawing (1-A)</b></p>	<p style="text-align: center;"><b>Implemented design (1-A)</b></p>

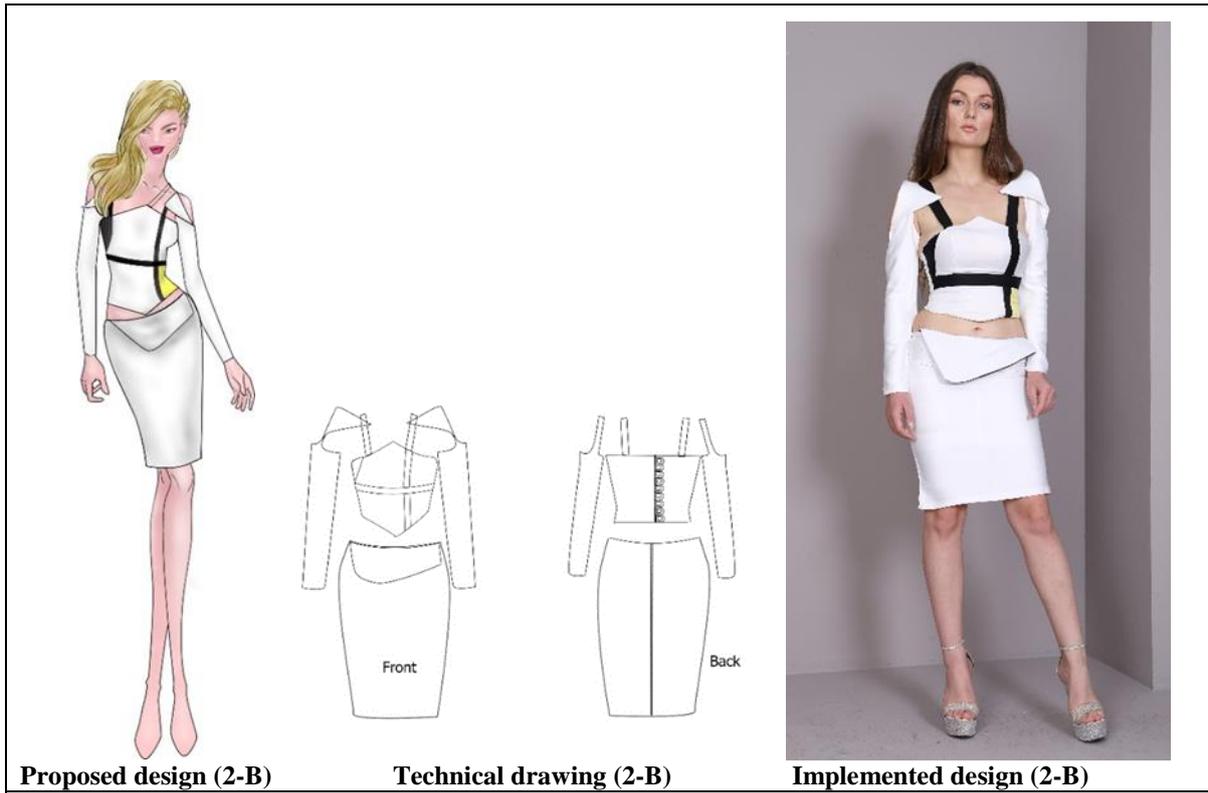
	 <p style="text-align: center;">Front                      Back</p>	
<p><b>Proposed design (1-B)</b></p>	<p><b>Technical drawing (1-B)</b></p>	<p><b>Implemented design (1-B)</b></p>
	 <p style="text-align: center;">Front                      Back</p>	
<p><b>Proposed design (1-C)</b></p>	<p><b>Technical drawing (1-C)</b></p>	<p><b>Implemented design (1-C)</b></p>

<b>Source of inspiration:</b>	Mondrian’s painting (black-white). Mondrian sought to express a more dynamic rhythm in his abstractions. His innovation introduced the grid of horizontal and vertical lines. In this particular composition, the lines appear to extend beyond the edges of the canvas. This particular example relies upon only three lines of varied thickness, bisecting the white picture plane in order to express Mondrian's ideal of active balance. With the complete absence of color in this painting, Mondrian has also prefigured the Minimalists' interest in pure form and favoring of black and white colors.
<b>Main design</b>	A bodice that inspired by Mondrian’s painting and depends on the grid with three lines of varied thickness in black and white colors. The asymmetrical balance was achieved through emphasizing Mondrian’s grid on a small area (bodice), versus the big plain area of the skirt. The contrast between black and white colors used to draw attention to this part of the design. The design achieved transition rhythm through moving the eye between different parts of the design. There is a harmony among the design lines and colors. Unity is accomplished among the design parts.
<b>Removed and/or added modules</b>	Sleeves-straps-skirts.
<b>Fasteners</b>	Buttons-snaps.
<b>Coloring method</b>	
<b>Materials</b>	Satin –chiffon

**Design (2)**

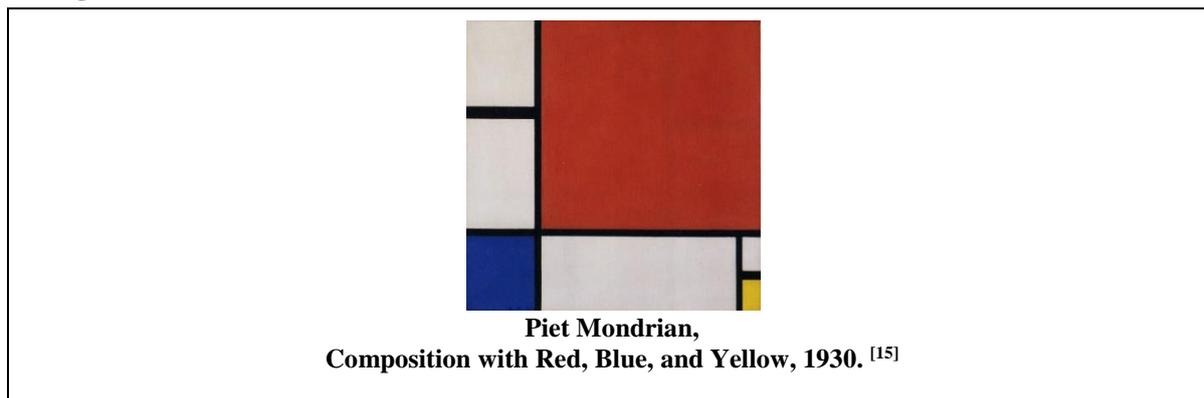


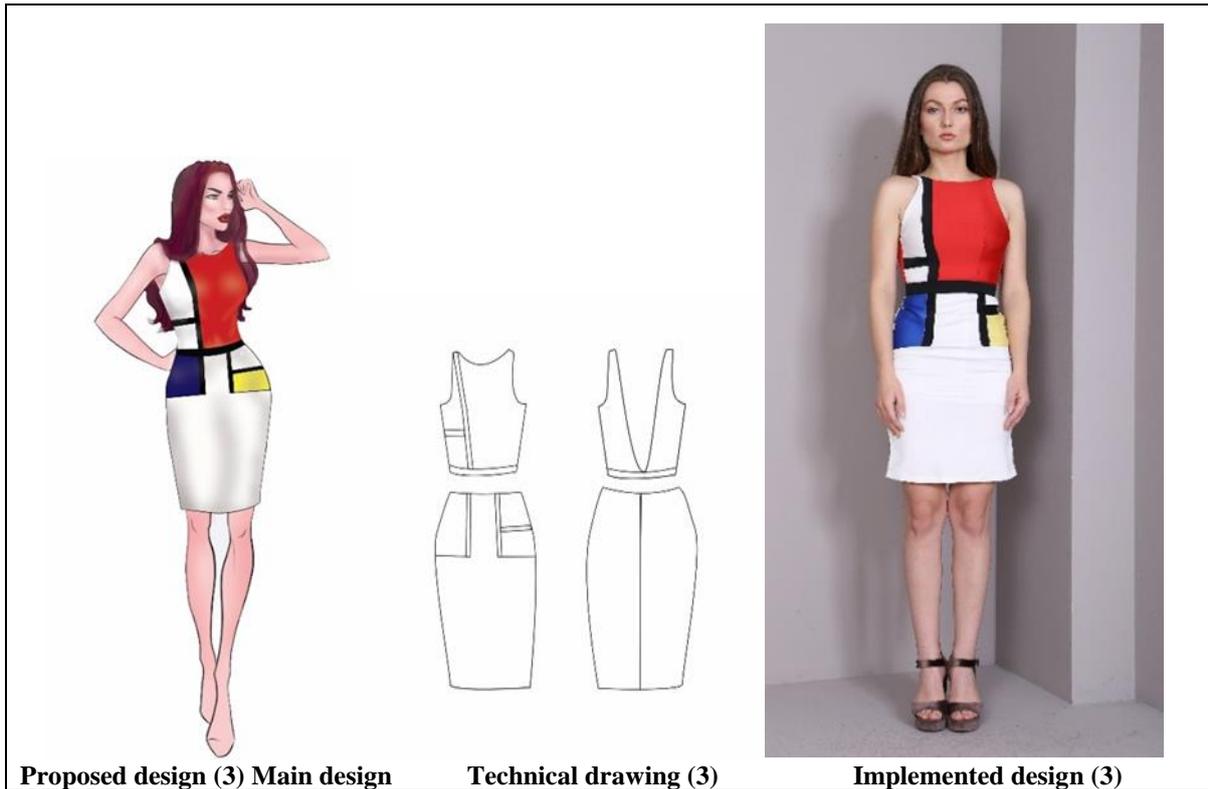




<b>Source of inspiration</b>	In Lozenge Composition with blue gray yellow Mondrian rotated a square canvas to create a dynamic relationship between the rectilinear composition and the diagonal lines of the edges of the canvas. Deceptively simple, his works are the results of constant adjustment to achieve absolute balance and harmony, and they reveal an exacting attention to the subtle relations between lines, shapes, and colors. The artist hoped that his paintings would point the way to a utopian future.
<b>Main design</b>	A bodice that inspired by Mondrian’s painting and depends on the rhombus silhouette with three diagonal lines, which restrict small coloured areas. Good proportion added a pleasing relationship between the designs in the bodice. Contrast between vertical and horizontal lines added a visual interest. Unity gave an overall impression, a feeling of belongingness to the composition that attracts and holds the attention of the viewer and gave a balanced look to the design.
<b>Removed and/or added modules</b>	Sleeves-straps-skirts- triangular piece of fabric.
<b>Fasteners</b>	Buttons-snaps.
<b>Coloring method</b>	
<b>Materials</b>	Satin

**Design (3)**

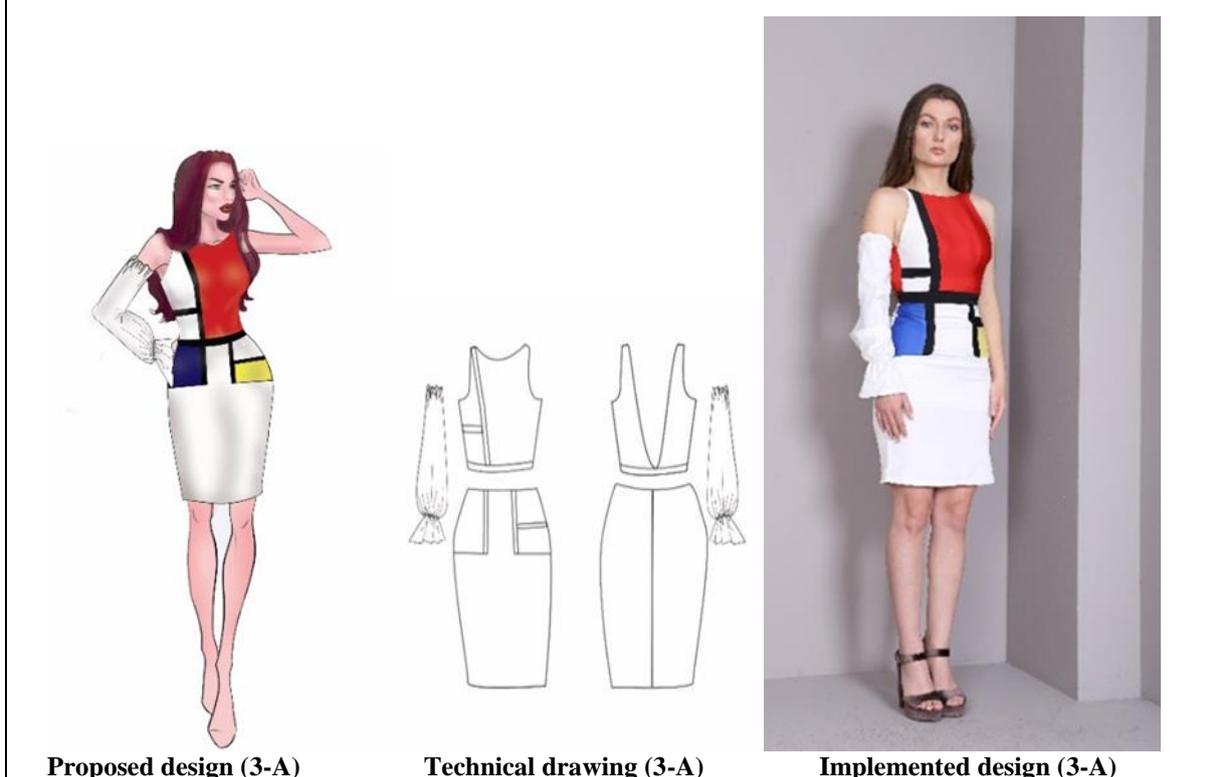




Proposed design (3) Main design

Technical drawing (3)

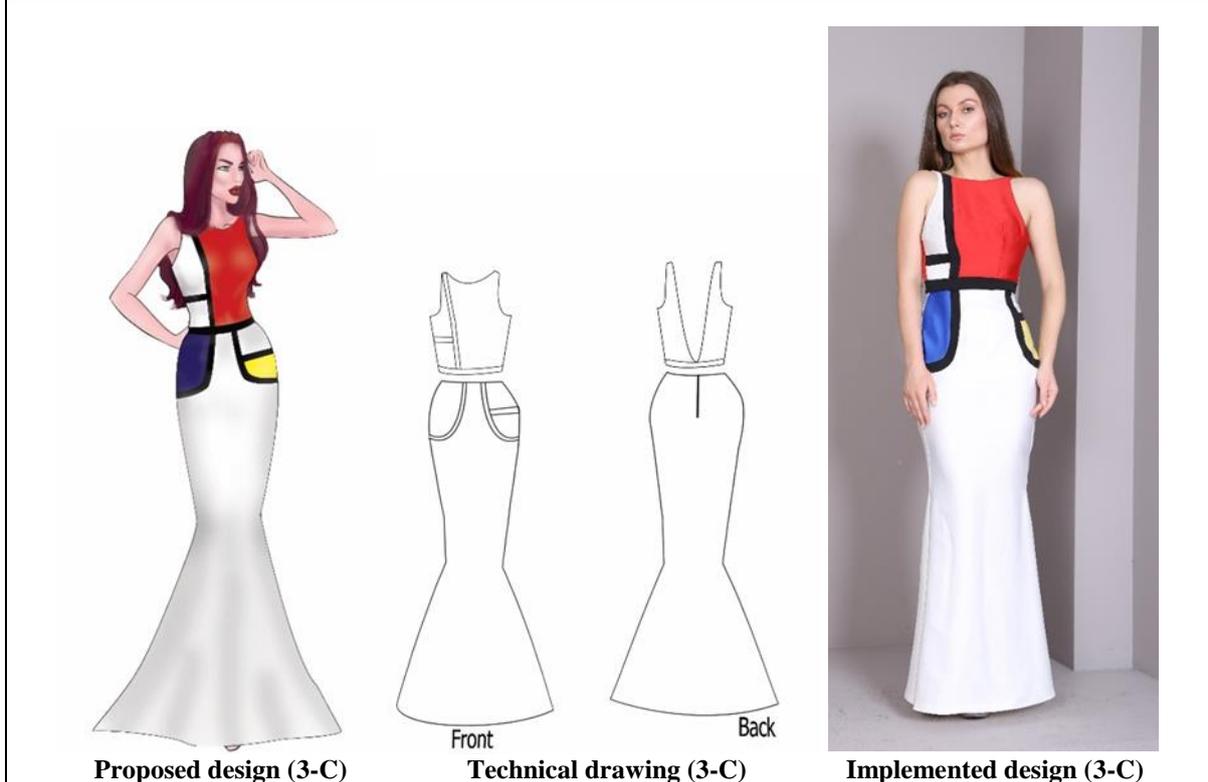
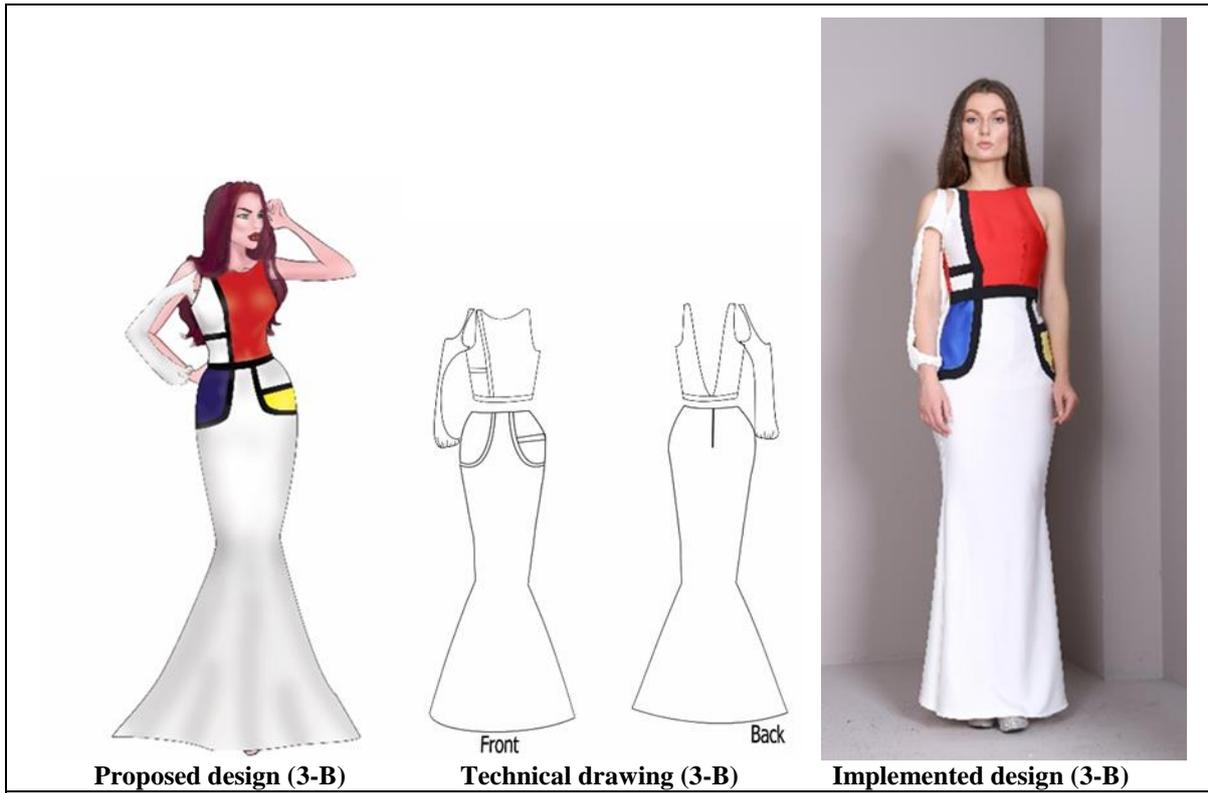
Implemented design (3)



Proposed design (3-A)

Technical drawing (3-A)

Implemented design (3-A)



<p><b>Source of inspiration</b></p>	<p>Examining Composition with Red, Blue and Yellow, Mondrian's De Stijl practices are in full effect. The contrasting horizontal and vertical lines represent to Mondrian an active relationship in which he intended to mimic the rhythm and vibrations of life that transcends symbolic knowledge. The reduced colors of red blue and yellow and the accentuated thick, black lines that cross over each other are similarly rendered. His depiction of inner reality (essence of life), is believed to be found through the interplay of contrasting pictorial elements. It is arguable that all elements found within Composition are contrasting and thus indicative of the inner harmony of life that lies beneath the surface.</p>
<p><b>Main design</b></p>	<p>A bodice and a skirt that were inspired by Mondrian's painting and depend on the contrasting horizontal and vertical lines and the priority of primary colors.</p> <p>The contrast among vertical and horizontal lines used to draw attention to this part of the design. The design achieved transition rhythm through moving the eye among the different parts of the design. There is harmony between the reduced colors of red blue and yellow and accentuated thick, black lines. Unity is accomplished among the design parts. Overall, all of the parts of the design work well together, so that a well-proportioned look was resulted.</p>
<p><b>Removed and/or added modules</b></p>	<p>Sleeves-straps-skirts.</p>
<p><b>Fasteners</b></p>	<p>Buttons-snaps.</p>
<p><b>Coloring method</b></p>	
<p><b>Materials</b></p>	<p>Satin</p>

#### 4- Discussion and conclusions

The modern fashion world is driven by fast fashion trends, and consequently the problem of over- consumption has occurred. Consumers are encouraged to purchase and discard garments frequently. This action brings negative impacts to the environment, society and economy. Transformable fashion is considered as a possible solution to satisfy consumers' desires and minimize their purchasing frequency.

Modular design system is a dressing system that contains several detachable small modules. Each module can be adjusted independently and separately without affecting other modules. This system can maximize the possibility of each garment by rearranging or transforming components into different styles.

The modular design system described within this research was based on modules that were removed and/or added to the main design, so various styles are created from the main design.

Modular design system implements the highest flexibility and versatility of garments among the existing types of transformable design. In order to meet the individual styles and preferences of wearers, modular design allows wearers customization of the garment into any possible combinations by modifying the modules. This conceptual framework of adjustable clothing offers a wider range of wardrobe options and gives an infinite number of creations to a garment.

The design was strengthened by Mondrian's paintings as a source of inspiration. Mondrian's planes and primal colors added aesthetic values to the designs, such as: contrast, rhythm, emphasizing, harmony, and unity.

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