ARAŞTIRMA MAKALESİ
(Research Article)

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Simulation of African Print Fabrics Using Screen Printing Technique in the Textile Design Studio

Tekstil Tasarım Stüdyosunda Tema Baskı Tekniğiyle Afrika Baskı Kumaşlarının Simülasyonu

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ABSTRACT

African print is the textile term used to describe machine printed wax print designs on fabrics. These fabrics are commonly referred to as Ankara fabrics. They are valuable items in the African textile market because they have high economic value. This study focused on the simulation of African print fabrics in the textile studio using screen printing technique. The study adopted qualitative research method using practice-led research technique in the textile studio. Five (5) African print fabric designs were created using CorelDraw graphic design suite. CorelDraw graphic suite was used because of its flexibility for colour separation. The materials used are screen printing mesh, textile ink, fabrics, squeegee and exposure unit among others. The study established the possibility of producing novel African print fabrics without the need for heavy machines. It was therefore recommended that textile designers should engage in studio production of African print fabrics. This will enhance the production of original and novel African print fabric designs that are readily available to the end users.

ÖZ

Afrika baskısı, kumaşlar üzerindeki makine baskılı mum baskı tasarımlarını tanımlamak için kullanılan tekstil terimidir. Bu kumaşlara genel olarak Ankara kumaşları denir. Ekonomik değeri yüksek olduğu için Afrika tekstil pazarında değerli ürünlerdir. Bu çalışma, tekstil stüdyosunda serigrafi tekniği kullanılarak Afrika baskı kumaşlarının simülasyonuna odaklanmıştır. Çalışma, tekstil stüdyosunda uygulamaya dayalı araştırma tasarımını benimsedi. CorelDraw grafik tasarım paketi kullanılarak beş (5) Afrika baskılı kumaş tasarımı oluşturuldu. Renk ayrımı için esnekliği nedeniyle CorelDraw grafik paketi kullanıldı. Kullanılan malzemeler diğerleri arasında serigrafi ağ, tekstil mürekkebi, kumaşlar, silecek ve pozlama ünitesidir. Çalışma, ağır makinelere ihtiyaç duymadan yeni Afrika baskı kumaşları üretme olasılığını ortaya koydu. Bu nedenle tekstil tasarımcılarının Afrika baskılı kumaşların stüdyo üretimine girmeleri önerildi. Bu, son kullanıcılar için hazır olan orijinal ve yeni Afrika baskılı kumaş tasarımlarının üretimini artıracaktır.

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1. Introduction

African Prints are major raw materials for the fashion Industry in Africa and even in the international fashion world (Amankwah & Howard, 2013; Uqalo, 2015). Ogunduyile (2001) and Onwuakpa (2016) studied African print designs from the cultural standpoint and described it as an essential part of the culture, viable for the development of the economy of a nation. Akinwumi (2008) defined African print as a general term used by the textile firms to describe machine-printed fabrics using wax resins and dyes to achieve batik effects on cloths while Uqalo (2015) described African prints as the vibrant, attention-grabbing fabrics used across countries in Africa with varying patterns and colours. These patterns represent proverbs, poems, and traditional fables while the colours symbolize social status, age, tribe, and marital status. The term also covers those imitation resist-look fabrics which have a resemblance of the waxed type effects (Akinwumi, 2008). However, Essel (2017) raised a terminological dispute about the term African prints stating that most of these fabrics are manufactured in European and Asian countries but the term African prints are generally accepted because though the fabrics are not of African Origin, they represent an integral part of African culture. Akinwumi (2008) and Uqalo (2015) observed that the designs in African prints have been adapted to African culture by adopting names and patterns from the cultures in the region. This extends the function of African prints beyond its use for only personal body beautification but also as a powerful medium of communication.

African prints were produced mechanically on a large scale and introduced into West Africa in the late 19th century by the European traders (Akinwumi, 2008). The author opined that these prints were acceptable to the people because of their cultural patterns and pure cotton nature of the fabrics. However, Tolulope and Babatunde (2013) believed that the prints were embraced by Africans because of its affordability and suitability for African climate.

Uqalo (2015) recorded that early African print manufacturers focused more on fabric colour than design because African people have different colour preferences. Deep blue prints were preferred in Nigeria while Ivory Coast preferred shades of brown, yellow, red and green and Ghanaians favoured orange and black. Hagen-jurkowitsch and Alexander (2016) and Uqalo (2015) noted that the focus has now moved from colour preference to the quality of design. Plant and animal motifs were the predominant motifs for the earliest print designs while patterns and portrait motifs were later incorporated in the early 1900s to cater for local tastes. Today motifs commonly used are alphabets, geometric shapes, representations of human beings, plants, animals and political or social symbols (Tolulope & Babatunde, 2013; Uqalo, 2015).

Designs were mostly imposed on African consumers in the past, but today, indigenous designers and marketers play a major role in the design and promotion of African print. Due to increasing rate of globalization, the differences in African lifestyles and

preferences are becoming less obvious. As a result of the aforementioned, the same African print designs now sell successfully across many countries once the designs are aesthetically acceptable (Uqalo, 2015; Wilson, 2001). African print fabrics today also increasingly incorporate Western objects and symbols. Umbrellas, radios, electric fans, mobile phones, and cameras are often overlaid onto floral background with other geometric shapes (Amankwah & Howard, 2013; Chichi et al., 2016). Uqalo (2015) noted that African print fabrics are used by people across all social stracta including entertainers, religious leaders, Politians and pessants in Africa and the diaspora.

Nigeria is the highest consumer market for African prints, accounting for 38% of total demand (Uqalo, 2015). African print is a major item produced in the Nigerian textile industry having a strong cultural, social and economic importance. African prints of various kinds are admired and used by Africans and also foreigners. These fabrics are produced and branded by different textile manufacturing companies. Some of the renowned brands are Hollandaise, Vlisco, Hi Target, Da Viva, Akosombo among others. It has been discovered that the African print brands produced by textile companies in Nigeria, such as Nichemwax, Springtex, Classic, Diamond and others are not well known even within Nigeria. This reveals that there is a brand management problem in the Nigerian textile industry which cannot be dissociated from the inadequate design practices in the industry. Hence, it is necessary to consider approaches for effective design and brand management in the textile industry to enhance the production of original designs that will be internationally marketable (Adeloye, 2021).

African print fabrics are industrially produced in textile mills using engraved roller printing and automated screen printing methods; these production processes are capital intensive because of the cost of powering heavy pieces of machinery. The researcher is of the view that the fabrics could be produced manually in the textile design studio if the necessary procedures are considered in the various stages of designing and print applications. It is therefore assumed that the simulated studio types could be an alternative way to reaching out to more consumers. Adeloye (2016) noted that coreldraw graphic suite is a suitable CAD application for designing the artworks for simulation of African print fabrics.

CorelDraw Graphic Suite

Corel Draw is a PC-based graphic design vector drawing program. Corel Draw can be used to tackle a wide variety of projects ranging from Illustration and logo creation to Web graphics or multi-page marketing brochures, eye-catching signs and also textile designs. It can also be used to draw shapes, work with text, add colour and textile effects, Corel Draw is a very flexible vector design package (Adeloye, 2016). Corel draw has a lot of tools designed to make the application user friendly. Some of the design tools used for this research work are:

1. The pick tool
2. Shape tool
3. Bezier tool
4. Basic shape tool
5. Outline tools
6. Colour palletes

The pick tool

This is a vital tool in corel draw, as the name implies, it is used for picking (selecting) other design tools on corel draw. It is located at the top of the tool box, the first on the list. It has the shape of an arrow and its importance cannot be over emphasized.

Shape tool

The shape tool is used for detailed changing of the shape of objects. With the shape tool, straight lines can be converted to different types of curves. The shape tool is a very important tool for textile designs because textile designs comprise of lines and colours and different types of curved lines can easily be achieved on coreldraw using the shape tool.

Bezier tool

The Bezier tool is basically used for drawing lines using nodes, this tool can also be manipulated to draw curves and trace objects. It is also a very important tool for textile designers using coreldraw.

The basic shape tool

This is different from the shape tool earlier mentioned. The basic shape tool is used for drawing basic geometric shape such as circles, rectangles, triangles and other shapes. These shapes can be further edited and stylized using the shape tool.

Outline tool

This tool is used for selecting the outline properties of an objects in coreldraw. The outline tool is used for selecting the outline thickness, colour and type.

Colour palette

The colour pallete houses coreldraw colours, this makes the colour palette a very important tool for textile designers because textile design cannot be complete without colours.

2. Methodology

The study adopted qualitative research method using practice-led research technique in the textile studio. Five (5) African print fabrics were printed using screen printing technique. The digital designs were created using CorelDraw graphic suite. CorelDraw is a vector application with a user friendly interface and automatic colour separation feature. The designs printed have at least three colours. The following CorelDraw tools were used: pick tool, bezier tool, shape tool, outline tool and CYMK colour palette. The following materials were used for this research white cotton fabric, wooden mesh, printing chemicals, printing paste and exposure unit. The screen printing process was done painstakingly to ensure accurate colour registration for all the designs.

3. Discussion

Screen printing in textiles involves the application of colours on a fabric by impressing colours through the open parts of an exposed mesh using a squeegee. The following materials were used for the simulation process.

1. Wooden frame
2. Silk Screen
3. Photo stencil Emulsion
4. Sensitizer
5. Squeegee
6. Printing paste
7. Exposure unit

Wooden Frames

These are soft wood planks that are cut into desirable sizes and used to construct frames of 45 by 13 inches on which the mesh was firmly stretched with the use of the tack nails as shown in Figure 1. The frame was constructed to be bigger than the designs to be printed to allow enough space to act as ink duct.

Figure 1. Wooden frame (Source: Researcher's Fieldwork, 2020)

Silk Screen

This is the fabric which is stretched over the wooden frame for development. The types of cloth (mesh) suitable for screen construction are organdie, nylon, terylane or silk as shown in Figure 2. Coarser meshes are good for fabric printing because they can absorb better while the finer mesh are suitable for paper, plastic and less absorbent surfaces. Open silk screen was used for this research. Figure 3. shows a fully stretched silk screen on a wooden frame.

Figure 2. Silk screen (Source: Photographed by Researcher, 2020)

Figure 3. Fully stretched silk screen on the wooden frame. (Source: Researcher's Fieldwork, 2020)

Photo Stencil Emulsion

This is one of the chemicals used for coating the surface of the stretched mesh, it is a blue coloured chemical. Its function is to block certain the parts of the mesh after exposure.

Figure 4. Photo Stencil Emulsion (Source: Photographed by Researcher, 2020)

Sensitizer

This is the photo (light) sensitive chemical mixed with the blue emulsion so that the photo stencil emulsion can react to light. The quantity of sensitizer in the mixture determines how long the coated mesh will be exposed to light during screen burning and development.

Figure 5. Sensitizer (Source: Photographed by Researcher, 2020)

Squeegee

This is the device used to pull the printing paste across the screen in order to make a print. It consists of a flat piece of wood or plastic on which a thick rubber blade is fixed.

Figure 6. Squeegee (Source: Photographed by Researcher, 2020)

Printing Paste

This is a soft mass or mixture of dye and chemical assistance which is used for printing. Printing paste varies in quality and price. The printing paste used for this project is the industrial printing paste used for long lasting printing.

Figure 7. Printing Paste (Source: Photographed by Researcher, 2020)

Exposure Unit

The exposure unit was used to burn all the designs on the mesh. This served as a replacement for the manual method of burning the mesh with the sun. The exposure unit also served the purpose of a light box for arranging the designs as shown in Figure 8.

Figure 8. Exposure Unit

Figure 9. Exposure Unit

(Source: Photographed by Researcher, 2020)

Screen Printing Procedures

The processes involved in screen printing for this research are:

1. Design creation
2. Design separation and printing
3. Making the design translucent
4. Coating the mesh
5. Burning and drying of the mesh
6. Printing.

Design Creation

The designs used for this research work were made using Coreldraw software, Coreldraw was used because it is user friendly and it also has a special feature that makes colour separation easy. The tools used for creating the designs are; shape tool, bezier tools, pick tool, basic shape tool, outline tool, and the colour palettes. The designs were created using separation colours (Cyan, Yellow, Magenta and Black) as seen in Figure 10 for automatic colour separation.

Figure 10. Design Created with Coreldraw (Source: Researcher's Fieldwork, 2020)

Colour Separation

This is the process of reducing the colours in a design to only two colours; black and white. The number of colours in a design determines the number of separations that will be done. Coreldraw can be used to separate colours easily by creating the designs using separation colours as shown in Figure 10. The separated colours were printed in black and white for burning on the mesh. Figure 11 shows the separated colours.

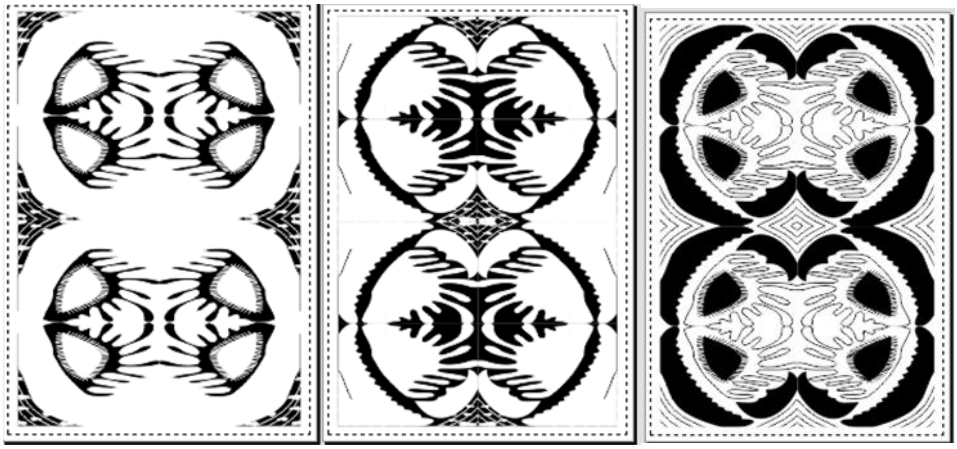

Figure 11. Colour Separations (Source: Researcher's Fieldwork, 2020)

Making the Design Translucent

For a design to be burnt on the mesh using photo stencil emulsion, the design must be printed on transparent paper so that light can pass through the white parts during the burning process. Designs for this research were printed on white paper and oiled to make them translucent as shown in Figure 12.

Figure 12. Oiling of Design

Coating the Mesh

This is the process of evenly covering the surface of the stretched mesh with the mixture of photo stencil emulsion and sensitizer. This process is shown in Figure 13 and 14.

Figure 13. Coating of a Mesh

Figure 14. Fully Coated Mesh

(Source: Photographed by Researcher, 2020)

Burning of the Mesh

This is the process of transferring the Art work (printed colour separation) on the mesh. This can be done manually using sunlight and timer and can also be perfectly done without stress using the exposure unit in the dark room. The exposure unit was used for the burning of all the meshes used for this research work. These meshes were developed using water and foam as seen in Figure 15 and Figure 16.

Figure 15. Developing a mesh (Source: Researcher's Fieldwork, 2020)

Figure 16. Fully Developed Mesh (Source: Researcher's Fieldwork, 2020)

Printing on the Fabric

This is the process of transferring the design from the screen to the fabric. This was achieved by forcing the printing ink through the open parts of the mesh as shown in Figure 17 and 18. For easy registration the fabrics were firmly pinned on the printing bed before printing.

Figure 17. Printing on the fabric

Figure 18. Printing on the fabric

(Source: Photographed by Researcher, 2020)

Five (5) African print fabrics were printed using screen printing techniques.

Factors considered for the generation of designs

1. Choice of colours: Akinwumi (2008) and Essel (2017) highlighted the importance of colours in African print fabric designs. Adeloye (2021) identified shades of green, yellow, blue, orange, red, brown and a dominating dark colour as the preferred colours for African print fabrics. These colours were put into consideration during the design generation process.
2. Design components: Adeloye (2016) identified some basic components of design that make African print designs stand out from other textile designs. These components include venial lines, wax effect, crackle effect, bold motifs and design flow among others. These components were incorporated into the designs produced.
3. Choice of motifs: Adeloye (2021) identified five categories of motifs used for African print designs. These categories include: simple, abstract, communicative, Afro-centric, cultural and household motifs. These different categories of motifs

were used for the designs generated. This consideration makes the designs produced user-centered by meeting specific requirements of the potential users.

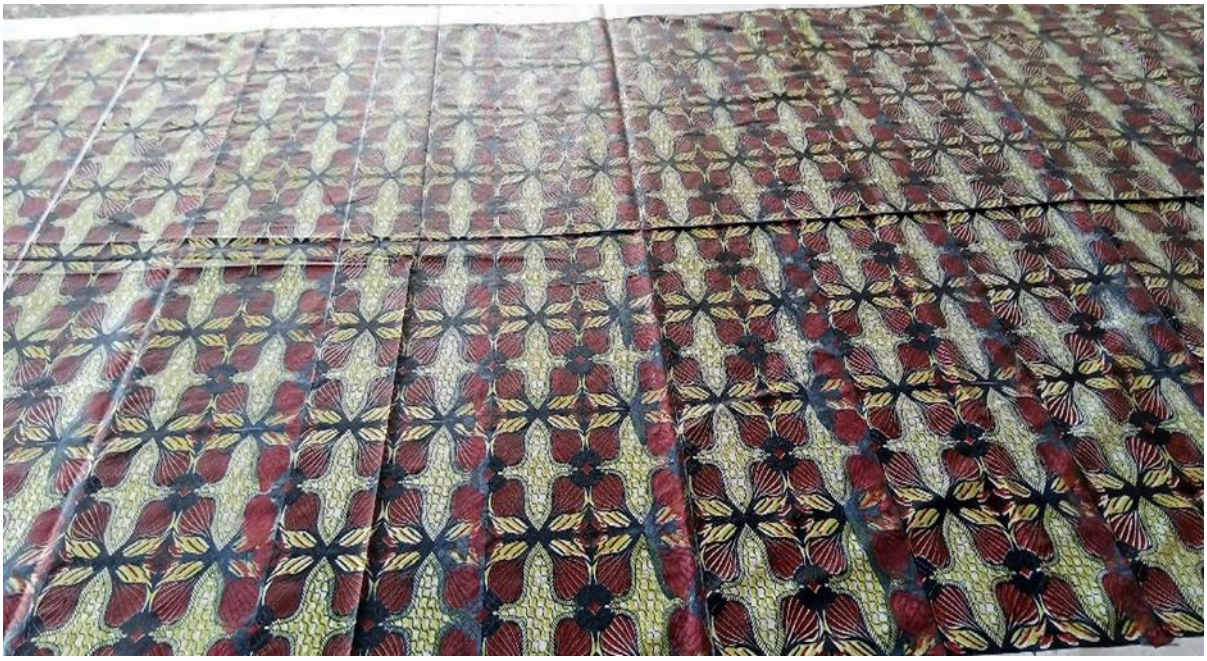

Figure 19. Printed 'Bulb' Design (Source: Researcher's Fieldwork, 2020)

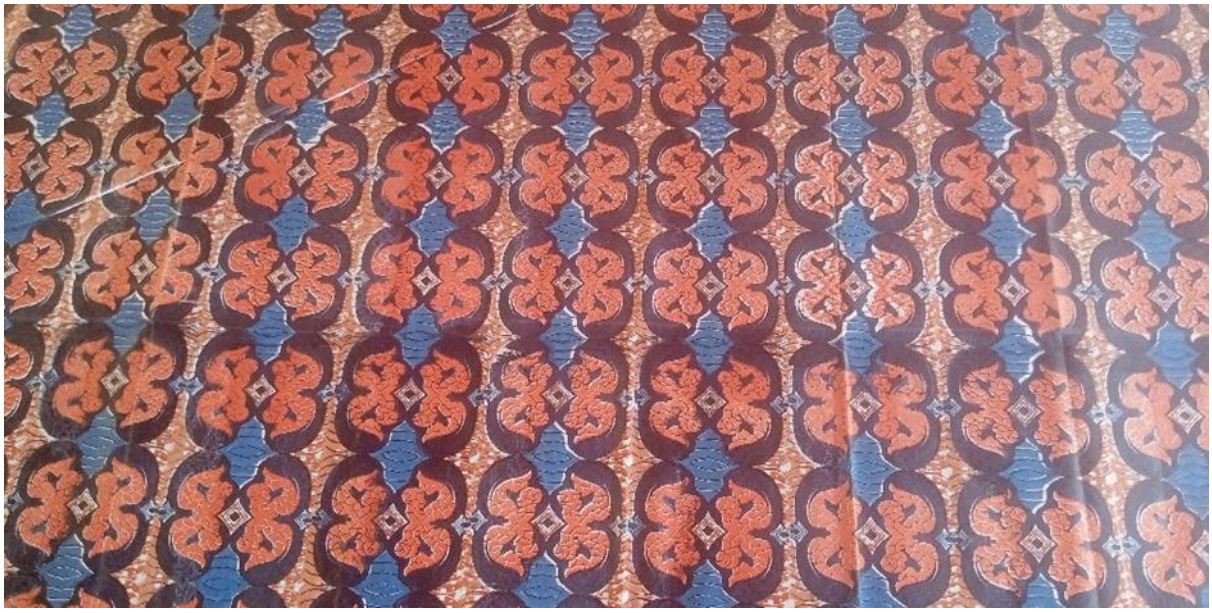

Figure 20. Printed 'Mother's Love' Design (Source: Researcher's Fieldwork, 2020)

Figure 21. Printed 'Sea Shell' Design (Source: Researcher's Fieldwork, 2020)

Figure 22. Printed 'African Pride' Design (Source: Researcher's Fieldwork, 2020)

Figure 23. Printed 'Beauty and Wealth' design (Source: Researcher's Fieldwork, 2020)

Conclusion

African print fabrics are machine printed fabrics that were imported by the European merchant and subsequently manufactured by the local textile companies in Africa. These prints have strong cultural, social and economic importance. Africans desire to possess African prints not only to demonstrate their good taste, but also to showcase social status and also to serve as a means of communication.

This study established that African print fabrics can be produced in the studio environment using screen printing technique. The designs used for the simulation were generated using a computer aided design application (CorelDraw). Textile design software has made studio production of textile prints easier, faster and more accurate. The simulation process is painstaking and time consuming but the outputs are unique and novel.

According to Adeloye (2022) and Adeloye, Ogunduyile and Akinbogun (2022), novel and unique African print designs attract international patronage because unlike imitated designs, original design can sell freely on international online retail markets like ebay, aliexpress, and amazon among others. This increases the productivity of the textile industry and by extension has a positive ripple effect on the nation's economy.

Production of original African print designs at studio level also gives room for the production of designs for specific occasion in small quantities which may not be obtainable in the conventional textile factories (Adeloye, 2014 and Adeloye, 2016). This enables the textile industry to reach out to a wider range of customers by meeting specific needs of consumers. This also increases the revenue generation of textile

industry. Production of novel African print designs increases the need for more creative designers in the textile industry. This creates job opportunity for teeming unemployed youths in the country (Batktawer and Naheed, 2015). It is therefore recommended that textile designers should engage in studio production of African print fabrics. This will enhance the production of original and novel African print fabric designs which will in turn positively influence the revenue generation of the textile industry and the GDP of the nation at the long run.

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