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Exploration of Innovative Techniques in Printed Textile Design

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Abstract:

This work explores innovative techniques in printed textile design as means of introducing creativity and providing new and varied ways of decorating textile materials. The trend in fashion is dynamic and as such, people's preferences for fabrics keep revolving. This therefore gives an urgent call for the need to explore various methods of printing, since these are the possible ways to respond to the fabric needs of these new trends in textiles design. Art studio-based research design was used under which exploration and experimental methods were adopted in the execution of these works. Some innovative techniques applied includespray printing, local sponge and broomsticks printing,twigs block printing,marble printing,bottle (Acripuff/Acrilex) printing, brush printing, lace transfer and fabric painting. A number of ground-breaking printing techniques were achieved byblending and varying existing techniques as well as exploring with different kinds of materials and tools.These include brushes, flowers, leaves, grasses, sponges, lace fabrics, bottles, squeegees and screens.The new techniques were employed to print sample fabricsout ofwhich some were sewn into garments.The study revealed that if existing textile-printing techniques are creatively blended or varied, they could give interesting results in printed textile designs that could provide unique handcrafted printed fabrics to consumers and take over this niche market.This research work shows the need for further inquiry into exploring more techniques for textile printing especially among textile students and small-scale textile designers.

1. Introduction

Printing is widely used in various styles on either fabrics or yarns. Textile printing according to Tortora et al (1996) is the application of colourants in definite repeated patterns to a fabric, yarn or sliver by any one of a number of methods other than dyeing. The authors further elaborated that in textile printing, a pigment is deposited in the form of paste and treated with steam or chemicals to cause it to migrate into or adhere to the textile material; the design is not woven or knitted to the cloth but applied after the cloth is made. However, a narration by Storey, (1992) is of the observation that the term ‘textile printing’ is vague and could be used to indicate the patterning of cloth by means of printing, dyeing or painting. She went beyond this to divide printed fabrics into four classes or styles, namely, the ‘resist’ style, the ‘dyed’ (or mordant) style, the ‘discharge’ style and the ‘direct’ style. This implies that the term has several interpretations some of which may include dyed, sprayed or even painted fabrics or any format through which a print paste is used to transfer design onto fabric.

1.1. Traditional Print Process

Traditional textile print development revolves around 2 types of printed patterns, the repeated pattern and the engineered panel piece. The repeated pattern is typically created for rotary screen-printing and often done in high volumes of 3,000 yards. The engineered panel piece is typically created for flat bed screen-printing and is often done for strategic placement of a print onto a garment unit such as an apparel top or bottom or a border print(First2print, 2015).

Hand printing is said to be a fast and easy way to put your personal ‘stamp’ on almost anything in your life. There is multiple hand printing techniques that you can use to add cute patterns to everything you own. They include the use of fruits and veggies as a stamp(Stewart, 2012).



Figure 1: Fruit and vegetable stamp

In this case the pattern or shape is create by the fruit and vegetable.

Another hand print technique involves the use of homemade foam stamp to make an anchor statement wall. Here designs are cut on foam where in one instance the negative shapes are removed leaving the positive image to stand out as groove and relief respectively. On the other hand, the positive image could be removed to forma groove leaving the negative part to stand out as relief. Figure2 illustrates an effect on interior decoration with the use of foam stamp(Shelton, 2013).



Figure2: Foam stamp

Custom paper stenciling technique is another form of hand printing method. Just like it is done in normal stenciling; cardboard paper is the surface on which design is drawn and cut out. Appropriate colour is picked with foam and dubbed on the cutout portions on the cardboard onto the substrate on which the final design is to be printed as in Figure 3(Larson, 2012).



Figure 3: Paper stencil technique

Direct painting on fabric requires higher imaginative power and good painting skills. This is because the scene desired by the textile artist to be painted must first be conceived in the mind's eye before translating it onto a fabric with the use of brush and suitable fabric paint as illustrated in the stages from Figures 4 to 7. that depicts an abstract scene on a pillow case(Bratcher, 2012).



Figure 4: Tape back of sheets together

In the sample below supplies needed include: Paintbrushes, fabric marker, paint pot strips, masking tape, paint-by-number guide, Martha Stewart's Multi-Surface Craft Paint (fabric paint), heavy weight cotton for pillow back, plain light-coloured utility fabric for pillow front, poly-fill, scissors, coordinating thread and hand sewing needle. Line up the two sheets and tape the back together, lay paint-by-number guide on top of your front fabric and cut out to exact size Figure 4.

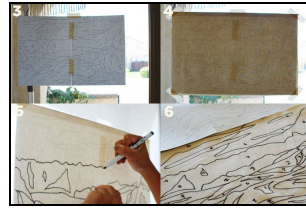


Figure 5: Sketches

Tape paint-by-number guide on a bright window. Taping the utility front fabric on top of the guide follows this. Using your fabric marker, trace the picture onto the fabric. Do not mark the numbers, while tracing on the window, save that for the next step. Using the guide, mark the numbers in its corresponding area Figure 5.

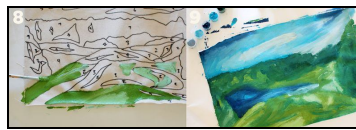


Figure 6: Painting of scenery

Start painting your picture as in Figure 6. To get the look of the pillow pictured, the key is in the blending. Feel free to play around with colours while painting. The final work is shown in Figure 7.



Figure 7: Final work

The use of handwriting skills to create wax resist scarf is another type of hand print method. This method requires the use of molten wax. A brush is dipped into the wax and any inscription that the textile artist desires is written on the fabric after which the fabric is immersed in a dye bath. The waxed portions resist the dye whereas the unwaxed portions absorb the dye to create batik effect as in Figure 8 (Larson, 2013).



Figure 8: Materials

Materials that are required for this technique comprise cotton fabric, wax resist sticks or crayons and fabric dye.



Figure 9: Sketches

First, draw something on your fabric. For a different effect, melt the tip of your crayon with a candle before drawing with it. If you choose to use the candle just be sure to use newspaper under your fabric.

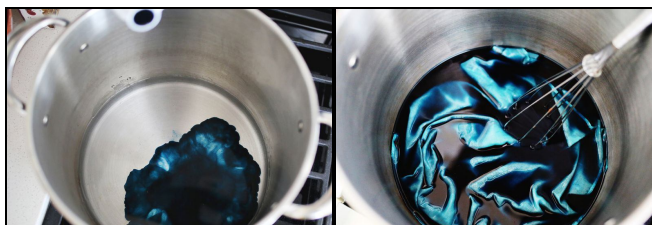


Figure 10: Fabric immersed in dye bath

Just follow the instructions on the dye bottle. I recommend Rit dye because it is easy to save the leftovers for future projects.

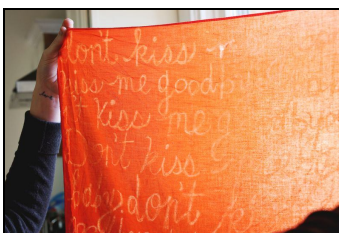


Figure 11: Drying dyed fabric

When you are done, rinse the fabric and hand wash it with soap in the sink. Hang it up to dry. After it is completely dry if your fabric seems to have an excess of wax you can remove it by placing the fabric between two pieces of newspaper and ironing it.



Figure 12: Final work of hand writing on fabric

These are just to mention few, nonetheless the two easiest ways to hand print are by carving your own block stamp or making your own foam stamp (Chapman, 2013).

Over the years, the technique of textile printing has undergone significant transformation due to major research, development and innovation with the latest being digital printing of fabrics and garments with inkjet printers. Today computers have the capacity to transfer designs onto fabric. This is possible partly due to the efforts of textile chemists in the development of new materials such as dyes and inks (pigments) to suite these newly developed textile-printing machinery and consequently meet up with the ever-changing trends in textiles.

1.2. Digital Fabric Printing Technology

Currently great advances in textile printing have been in the area of head technology and ink development. This process is similar to the computer controlled paper printers used for office applications but on a complicated scale where numerous variables are managed to give you the best possible outcome on fabric. Some of the variables needed for coordination of successful digital fabric printing are files and colour management, printer and RIP technology, fabric pre and post treatment processes, inks/dyes, and client expectations (First2print, 2015). The process of direct fabric printing involves running the fabric itself through the computer as if it were paper. The printing is done directly on the fabric with the computer inks. Numerous experiments were conducted to keep these inks from running and fading from the fabric by the use of acrylic sprays or silicon, but this was never very successful. In 1999 The Jenkins Company came up with a new product called "Bubble Jet Set" or "BJS" that are suitable for silk or cotton fabrics. The printing method is simple; a piece of fabric, precut to a size suitable for your printer (usually 8.5" x 10") is soaked in the liquid and

hung to drip dry. The treated fabric is ironed and then ironed to a backing of freezer paper to help stiffen it to allow it to be run through the printer. Any loose threads should be trimmed to prevent them from catching in the printer mechanism. The sheet of stiff fabric is run through and printed with the image (Druding, 2000). Even with these achievements, textile technologists and machinery manufacturers still put in strenuous efforts aimed at further modification of these processes to reduce production time and cost to its barest minimum. Though many works have been done per the literature reviewed, the sky is the limit as far as creativity, exploration, innovation, self-confidence and readiness to apply locally available materials are concern.

2. Materials and Methods

The research design was art studio practice under which exploration and experimentation methods were employed to select suitable materials and methods for the work. The aim of this project was to generate new techniques and test their potentials by employing them in textile printing. Some of the materials and tools used include leaves, flowers, grasses, local sponge, wooden stamp, spray gun, different textile substrate, water-based and acrylic-based print paste. The procedure adopted was to vary and merge existing techniques to come out with these unconventional methods of printing textiles. In all eight techniques were explored; these techniques were categorized into two groups; natural and artificial sources. The natural sources refer to those techniques explored using natural objects from plant parts such as leaves, flowers and grass. The artificial source on the other hand refers to those explored by employing man-made objects like local sponge and wood. Three techniques were employed under natural sources where as five techniques were used under artificial sources.

2.1. Techniques from Natural Source

There were three techniques from plant source that were used namely; spray printing, local sponge printing, broomsticks printing and twigs block printing.

2.1.1. Spray Printing Technique

The idea in this technique was to place some objects on the surface of a fabric and spray print paste around them. The result was that the shape of objects used stood out as the positive images with the sprayed background as the negative image. A sample fabric with a dimension of

18 inches x 54 inches was cut and stretched out on a printing table with the aid of a stapler. Grass, leaves and flower stalks were then arranged on the surface of the stretched fabric and held firmly in position as shown in Figure 13.

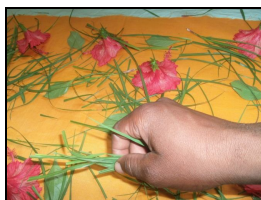


Figure 13: Arrangement of objects on fabric to be sprayed.

The leaves and flowers were arranged in a desired order while the grasses were sprinkled on the surface of the stretched fabric to achieve an overlapping effect. This can vary depending on the creativity of the textile artist. After arranging the items, the print paste was mixed with water to a light consistency and poured into the reservoir of a pesticide hand pump that was used as a spray gun. The print paste was sprayed over the leaves and grasses on the fabric and allowed to dry as shown in Figures 14a and 14b.

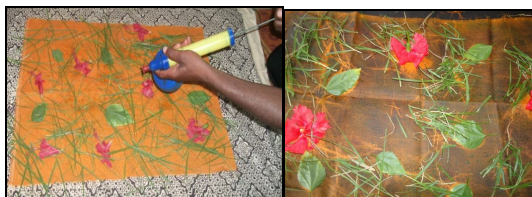


Figure 14a: Spraying process. Figure 14b: Final design.

2.1.2. Local Sponge and Broomsticks Printing

In this technique, a kind of traditional sponge made from tree barks called *Kocha* in the Ga dialect was used together with local broomsticks. The sponge was cut-off from the bunch, twisted and tied with thread in the preferred manner before attaching it to a wooden block with adhesive (white glue). The sponge was twisted and tied in the shape of the letter "S" while two pieces of wood were also glued in-between the sponge in order to observe the print results of the two side-by-side. The handle of the block was then fixed with nails after the glued items have dried and used in stamping with print paste to give the desired shape as in Figures 15 and 16.



Figure 15: Sponge block. Figure 16: Printing with sponge.

After the two colours have been printed successively, with approximately ten minutes allowed for drying, the broomsticks were then used in printing the fabric with green paste. This served as textures in the printed fabric and improved the aesthetic appeal as well Figures 17 and 18.



Figure 17: Scratching of fabric with broomsticks. Figure 18: Broomsticks with paste.

2.1.3. Twigs Block Printing

With this technique, a number of twigs were gathered, cut and arranged on a wooden block in a desired manner with the aid of adhesive (white glue). After the gluing process, the block was allowed to dry for about twelve hours so that the twigs could remain firmly attached on the glued surface for printing. The aim of this experiment was to find out the possibility of transferring print paste with these twigs directly onto a fabric so as to take the shape of these twigs. Figures 19 and 20 show the twigs block and the printing process with this block.

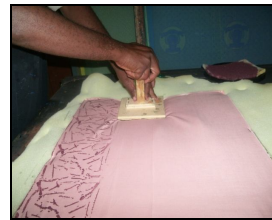


Figure 19: Twigs block with print paste. Figure 20: Printing with twigs block.

The two colours were printed consecutively with the same block and the fabric was allowed to dry after the first colour. The block was then washed and dried to get it ready for printing the second colour. The pink coloured fabric was printed in light purple and blue-black but its position on the fabric was varied with the different colours. The print results after the first and second colours are shown in Figures 21 and 22.

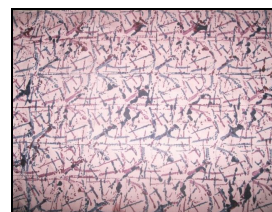


Figure 21: Print result of first colour.

Figure 22: Print results after second colour.

2.2. Techniques from Artificial Sources

These refer to those techniques obtained by using man-made objects in the exploration process. Five techniques were achieved in this category namely:

2.2.1. Marble Printing

This was aimed at achieving the unrestrained effect of marble tie-dye in textile printing. The fabric sample was squeezed together on an appropriate printing surface in a preferred manner with both hands and an already developed screen with a marbled design was then

placed over and printed with the aid of a squeegee using ordinary print paste. It is worth noting that in order to squeeze and maintain the fabric in such position for the printing, some little amount of water was sprinkled over the fabric in order to relax it. These procedures are shown in Figures 23 and 24.



Figure 23: Squeezing of fabric.



Figure 24: Printing of squeezed fabric.

As a norm in art studio practice, the fabric was taken off the printing table after the first colour was printed and spread out to dry under a shade as in Figure 25 (a) with the printed result of the first blue colour. Figure 25 (b) is the result after printing the second colour brown over the first printed colour.



Figure 25 (a): Blue marbled printed fabric. Figure 25 (b): Blue and brown marbled printed fabric.

2.2.2. Acrilex and Acripuff Bottle Printing

This technique involves the use of already made acrylic paints in small squirt bottles to print directly on fabrics. The paint bottles have pointed tips with nostrils that make them convenient to regulate during the printing process. Although Acrilex gives glittering effects and Acripuff does not, they are nonetheless both acrylic paints and as such should be given similar treatment during printing. Acrylic paints that were used in the printing are shown in Figure 26.



Figure 26: Acrilex and Acripuff Paints.

This technique was experimented on both cotton and linen fabrics during the printing process. Certain rules and precautions were observed among which includes; removing the cover of the bottle to reveal the inner pointed nip, which is then placed on the fabric and moved around in a preferred way while the bottle is pressed in accordance to the desired need for paste. It is advisable to sketch the design first with pencil on the surface of the fabric and then follow the pencil marks with the bottle in order to avoid printing errors or at least reduce them to the barest minimum. The printing process is in Figure 27 whereas Figure 28 shows the print result.

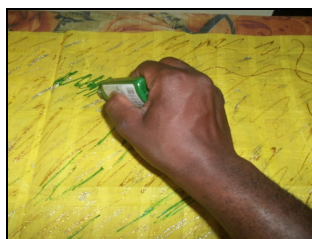


Figure 27: Acrilex and Acripuff bottle printing process.

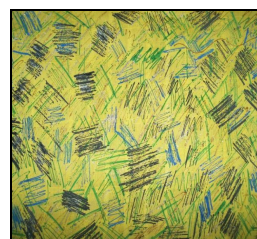


Figure 28: Acrilex and Acripuff bottle Printed fabric.

2.2.3. Brush Printing

In carrying out this technique, the aim was to uncover the possibility of using ordinary washing brush to play the role of a wooden block in textile printing and the possible effects that it will give on the surface of a fabric. First the brush was stamped on the paste and pushed around the surface of the stretched fabric in a preferred manner to create lines, which served as background designs or

textures. Then the processes of block printing were followed in printing the fabrics by placing the brush on a piece of cushion with 1-inch thickness with paste and stamping on the stretched fabric. The printing process and the brush printed fabric are in Figures 29 and 30. They show the brush stamping process with green printing paste to create the background design as well as the finished printed fabric. Water-base print paste was used in this technique.



Figure 29: Brush Printing Technique.



Figure 30: Brush printed fabric.

2.2.4. Lace Transfer Printing

This technique involved the application of water-base print paste on the surface of lace fabric and then immediately transferring it onto another fabric so that the print takes the knitted design structure of the lace material. In this process, the lace material was first stretched and held firmly in place with thumb pins on a printing table. Some portions of the lace fabric were cut with a pair of scissors and folded in a desired manner and stapled to create some interesting effects and alterations in the final print. A piece of foam was used to apply the print paste onto the surface of the lace material after which the fabric to be printed was placed on top and then printing was effected with the use of a wooden rolling pin. The fabric was then removed and dried after the transfer of the design while the lace fabric with residual paste was also taken off from the printing table and washed off. It is important to wash-off this excess print paste so that the lace material can be re-use later. These processes are shown in Figures 31 and 32.



Figure 31: Application of paste on lace.



Figure 32: Rolling of fabric to effect transfer.

The printed fabric was removed and dried under a shade. The dried printed fabric was then steam-ironed to fix the colour and finally washed in warm soapy water in order to remove any excess paste.

2.2.5. Fabric Painting Technique

Fabric painting technique is the application of print paste with sable or bristle brush on the surface of a fabric in a desired pattern. The normal processes in painting were followed. Thus, the colour was mixed in a palette and the lighter colour in this case which is the orange, was painted first and allowed to dry before the brown was added. This is important since the brown could be used to correct any errors that might have resulted in painting the lighter colour. The process and results are in Figures 33 and 34.

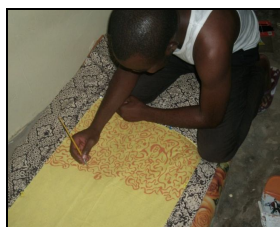


Figure 33: Painting of first colour.

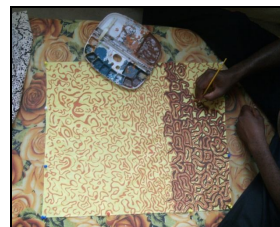


Figure 34: Painting of second colour.

However, because the fabric was painted with acrylic paint, which usually takes a longer time to dry, final washing-off process was done after 72 hours to remove all excess print paste from the finished work. The result is in Figure 35.

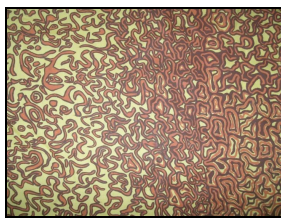


Figure 35: Brush Painted Fabric.

The results after the washing were positive since all stains and dirt accumulated during the printing process were cleaned while retaining the print quality. These exploratory and experimental printing techniques resulted in very interesting aesthetically pleasing new effects.

3. Results and Discussion

The work was categorized under two major headings namely; techniques from plant sources and techniques from artificial sources. Three techniques were explored under each of the two categories. The print results obtained indicated that these techniques could be adopted to introduce new and mind-blowing effects in printed textile designs.

3.1. Designs from Natural Source

The results discussed under this category include textile-printing techniques that were obtained by using natural objects from cellulosic base such as leaves, flowers, grasses, local sponge and wood. The five techniques are

- Spray Printing
- Sponge Block and Broomsticks
- Twigs Block Printing Shown

3.1.1. Spray Printing

This technique enable smooth harmony of colours within the substrate that results in creation of accidental colours. Varieties of shapes are created as a result of some portions of the fabric that were resisted from the colour application with different plants parts. The effect is the tiny vein-like patterns in addition to different sizes of the shapes that are formed. Contrary to conventional textile printing method that require the use of pre-determined design, this spray printing technique thrives on accidental natural shapes, forms, colours and textures that results in unique aesthetically pleasing effects. The design was printed in two colours; brown and purple on an orange background with hand spray pump. Result from this printing technique is in Figure 36.

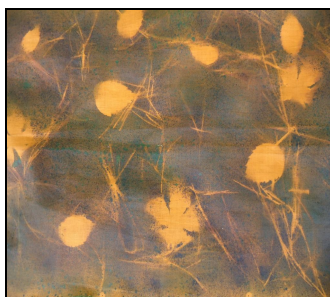


Figure 36: Fabric printed from spraying technique.

The exposed areas of the fabric were printed in brown and purple while the areas that were covered with the flowers, grasses and leaves revealed the orange background colour. These flowers, grasses and leaves served as the motifs of the print and the tiny dots from the hand spray pump served as textures. The end-uses of the fabric may include formal wear for both sexes, children's apparel, interior decoration for restaurants like table cover, napkins and curtains.

3.1.2. Sponge Block and Broomsticks Technique

The print in Figure 37 is the result of the local sponge block and broomsticks printing technique. The semi-circular shapes, which serve as the motifs are printed in brown and dark green and takes the shape of the sponge block whereas the cross hatches that serve as the textures were printed with two broomsticks held together. The layout format and colour scheme of the print create comfort to the viewer, the motifs and textures as well as the colours also relate well to one another. This fabric would be appropriate for a mummy cloth because of the shape of the motifs, textures and dark colours.



Figure 37: Printed fabric from sponge block and broomsticks technique.

3.1.3. Twigs Block-Printing

The intricate vein-like effect achieved in the print was not predetermined but accidental; they were produced as a result of the twigs that were used. Again it was found out that the technique makes room for additional colour effects that were produced directly on the fabric during printing. Aside the conventional colours that were used in the print these accidental design and colour effects achieved as a result of this twigs block print techniques enhances the aesthetic appeal of the printed fabric design. The final printed fabric produced with twigs block-printing technique is shown in Figure 38. The print, which is a two-colour work, is printed in light purple and blue-black on pink background. The two colours were printed in an overlapped manner by shifting the position of the block slightly so that the second colour falls over the first. The design has no textures since the uneven shapes and sizes of the twigs equally serve that purpose. This gives the fabric a great aesthetic appeal and makes it pleasing to the visual senses of the viewer. The fabric, design could serve the purpose of everyday wear for both sexes.



Figure 38: Printed fabric from twigs block.

3.2. Designs from Artificial Source

This category refers to the discussion of results obtained by using man-made objects in the exploration process as well as an appreciation of the printed fabrics. Five printed fabrics were achieved under this category by employing these techniques.

3.2.1. Marble Printing Technique

The design produced with marble printing technique is shown in Figure 39.



Figure 39: Printed fabric from marble printing technique.

The design though printed, had an appearance similar to marbled-tie-dye and as such, the exact design cannot be repeated and is appropriate for apparel designs for both men and women since the colours and design pattern appeal to both sexes. This design has neither motifs nor background textures. The focus here was to incorporate the aesthetic effects of marble dyeing in textile printing with print paste. This technique was executed on both cotton and linen fabrics to assess their rate of absorption, which yielded positive results in both cases. The fabric has a light green background, is printed in blue and brown colours in a marbled style with the colours blending and overlapping each other at various angles. However, some portions were left plain because of the folds that were created

before the fabric was printed over. It is a blend of blue and brown colours that take the shape of the folds created in the marbling before the fabric was printed over.

3.2.2. Bottle Printing Technique

The printed fabric produced by employing this technique is shown in Figure 40.



Figure 40: Printed fabric with the use of bottle (Acripuff/Acrilex) printing technique.

The fabric was printed with acrylic base printing paste in four colours; that is blue, green, silver and gold on a yellow background. The gold and silver colours give the glittering effects whereas the green and blue do not. The fabric is printed by making irregular lines of various sizes in an all-over pattern with the colours crossing each other at different angles that produced a fascinating appeal to the visual senses. The design has neither regular motifs nor background textures since the nature of the lines produced a similar effect.

3.2.3. Brush Printing Technique

The printed fabric produced by this technique is shown in Figure 41.



Figure 41: Printed fabric from brush printing technique.

The background colour of the fabric is pale green whilst the printed colours are army green and dark green. The effect of irregular lines that cross each other at different angles coupled with the interplay of various sizes of dots shapes serve, as textures in the design. The motifs are created with brush marks stamped on the surface. The technique makes room for accidental colours to be produced on the fabric as a result of overlapping of the colours. The result is an interesting colour harmony that was not pre-determined as in the case of conventional textile printing method. The fabric may be suitable for casual wear for both sexes.

3.2.4. Lace Transfer Printing

Figure 42 shows printed fabric from the lace transfer technique.



Figure 42: Lace transferred fabric.

The aim of this experiment was to find out the possibility of transferring directly knitted design from lace onto another fabric. This technique is suitable for monochrome; that is shades of the same colour. The printed fabric is in shades of brown that gives the printed fabric different hue of the same colour as the background colour harmonizes with the printed colour. The print result shows the floral

designs and tiny textures that were transferred from the lace fabric. It gives a replica of the knitted lace design on the printed fabric. The end-uses of this print may include women apparel and furnishing because of the floral motifs that women mostly have preference for.

3.2.5. Fabric Painting Technique

Figure 43 shows the printed fabric from the painting technique.

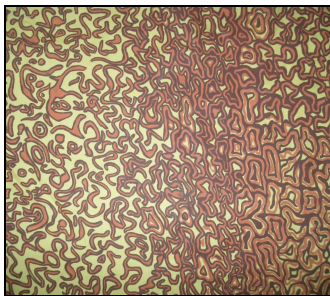


Figure 43: Hand painted fabric.

The fabric has yellow background colour printed with orange and brown. The orange was painted and allowed to dry after which the brown was also painted. The use of these related colours created good harmony in the print. The lighter oranges colour was painted first followed by the darker brown colour; this makes room for any mistakes to be corrected at any point in time. The layout of the design also adds up to its aesthetic appeal.

4. Conclusion

As increasing technological innovation in textile printing results in mass production of printed fabrics at relatively low cost and affordable for most people, there are some consumers who prefer something unique and customized because they always want to look different. This has created a niche market for hand crafted textile prints and that was the target and purpose of this project work. All of these printing techniques explored in these works are entirely unique and original with none of them bearing any similarity with works of previous authors that were discussed in the review. That confirms the novelty of this work and also points to the fact that creativity and the use of materials within the immediate environment of the textile artist could result in many more discoveries to enhance human life. There were two sources of inspiration for this exploratory and experimentation; the first is set of techniques from natural source and the second set from artificial source. In all eight techniques were discovered with three from natural and five from artificial sources and the details are as follows:

4.1. Natural

1. Spray Printing; 2. Sponge Block and Broomsticks Technique and 3. Twigs Block-Printing;

4.2. Artificial

4. Marble Printing Technique; 5. Bottle Printing Technique; 6. Brush Printing Technique; 7. Lace Transfer Printing and 8. Fabric Painting Technique.

The outstanding, unique, innovative, alternative textile printing techniques that have been discussed earlier allured to the fact that the project was very successful. Again it gives a direction for further experimental and exploratory art studio-base research work to be conducted that could result in marvelous textile print effects that has the potential to create employment and wealth towards national development.

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