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Ideation of Selected Natural Objects for Textile Design Using Adobe Photoshop Software

Isaac Aboagye
Lecturer, Department of Art Education, School of Creative Arts Education,
University of Education, Winneba, Ghana
Bennet Nyante
Lecturer, Department of Fashion Design and Modelling, School of Applied Art,
Design and General Studies, Wa Polytechnic, Ghana
Emmanuel Amos
Lecturer, Department of Fashion Design and Textiles Studies,
Kumasi Technical University, Ghana

Abstract:
The development of textile designs has witnessed an enormous growth rate from periods when designs were solely made with hand drawing tools to the present day where computer-aided design software programmes have simplified and improved the processes. It is for this reason that this research explores the possibilities of generating motifs and forming textile designs from selected natural objects with Adobe Photoshop software. It discusses other disciplines of design and the relevant features of the natural objects used in the production of the textile designs. The step-by-step procedures used in generating the motifs and the designs are outlined, with the results and appreciation of the textile designs. This paper contains relevant basic design principles and provides philosophical meanings to the surface pattern designs produced.The study shows that the computer with suitable design software can be used to manipulate any picture or sketch of an object to suit the designer's needs.

Keywords: Computer aided design, textile design, natural objects, motif and idea development

1. Introduction

Textiles today encompass a wide range of effects, techniques and ingredients that at first glance seem very disparate: new fibers, fabric treatments or computer technology often provide a starting point. The creations of opportunities for shared, interactive innovation have only become possible with the arrival of the third industrial revolution, based on computer and information technology.

The installation of computer-aided designs (CAD) and manufacturing systems represent a departure from the linear progression of the first and second industrial revolutions which initially brought mass production and then much higher speeds and standards of greater uniformity. The textile CAD software used in this study is suitable for designing fabrics with much flexibility on the manipulation of pictures, quick simulation of the final appearance through prints and reproducing faithfully their colour and structure.

Encarta (2005) defines design as a conscious activity, guided by aims and objectives; it refers to planned and organized actions intended to bring about some predetermined outcome although there may also be accidental or unexpected results. It clearly reveals that before one produces a design, the item, artifact or product to be executed should be pictured or perceived in mind. It further explains that design activity usually displays expertise knowledge, creativity and thoroughness. It has a close relationship with technology, human needs and aesthetics. Models or prototypes such as drawings or constructions allow problems to be explored, ideas to be visualized and intentions to be communicated.

Laseau, (1989) explains that graphic design deals with a number of artistic and professional disciplines which focus on visual communication and presentation. He further explains that various methods are used to create and combine symbols, images and or words to create a visual representation of ideas and messages. He adds that, a graphic designer may utilize typography, visual arts and page layout techniques in varying degrees to produce the final result of the project. Graphic design often refers to both the process (designing) by which the communication is created and the products (designs) which are generated. Linton (1996) defines graphic thinking as a term adopted to describe thinking assisted by sketching. He likens graphic thinking to architectural and states that this type of thinking is usually associated with the conceptual design stage of a project in which thinking and sketching work closely together as stimulants for developing ideas. Gama (1995) outlined the importance of fashion illustration and asserts that, first rough sketches are useful in the development of ideas into fabric choice and draping style. He added that fashion design is an exercise in imagination and problem solving when it comes to documenting the evolution of fashion as culture, it can easily be said that illustration has

become fashion designs number one ambassador, covering a visual timeline of materials, techniques and styles that have graced the fashion world over the past century.

1.1. Computer-Aided Design and Computer-Aided Manufacture (CAD/CAM)

Encarta (2005) explains computer as an electronic device that can receive a set of instructions or programmes and then carry out this programme by performing calculations on numerical data or by manipulating other forms of information. This indicates that the computer is an essential tool in almost every field of research and applied technology that makes possible the analysis of a collected data for a suitable or expected results.

Castelli et al (1999) commented on the use of computer-Aided Design in industrial production process and wrote that a CAD system permits to develop project functions, mainly based on the design of the item which one wants to create by using a series of tools provided by a data processing system. To improve the speed and efficiency of the operations which are usually made by hand drawing. The representations of variety of samples with complete and true colour effects permit the designer to examine a number of variations and with this, it will be possible also to study a large number of alternatives and make a choice before taking a decision. Economically, these systems are the results of a quicker preparation of the collections and the lower interference with the production activity.

Groover and Zimmer (1995) indicate that CAD/CAM is the technology concerned with the use of the digital computers to perform certain functions in design and production. Computer-aided design is the use of computer systems to assist in the creation, modifications, analysis or optimization of a design. Computer-aided manufacture (CAM) can be defined as the use of computer systems to plan, manage and control the operations of a manufacturing plant through either direct or indirect computer interface with the plant's production resources.

Rooney and Steadman (1990) wanted to find how the various uses of the computer fit into the design and manufacturing process. With this they maintained that the nature of the manufacturing process varies and this in turn affects the design process. In some fields, the technical specification for a design is very tightly defined, whereas in other areas such as architecture or graphic design there may be more freedom of action, and individual designers within the same profession which goes about the same work in many different ways.

In the opinion of the researcher, the manufacturing process determines the trend and form of design, and will require a specified computer system to achieve the desirable effect or results.

Krishnamoorthy (1991) opines that with the computer as a drawing tool, designers are not limited to images they can devise in pen or pencil. It offers the designer the ability to communicate new ideas more exactly, efficiently and quickly. They can easily adopt or change complex features without the traditional drudgery (pp.38, 41). This appears reasonable in that, CAD systems enable the designer to work directly with the customer. Using CAD as a marketing tool, the potential customer can become directly involved as the design is created. Producing designs by traditional design method means preparing numerous models or sketches in Perspex to check suitability and conformity.

Morris (1986) commented on CAD fundaments and stated that computer-aided design increases the possibilities of design tremendously allowing designers at last to be truly creative and come up with new concepts in design rather than having to worry about some of the more tedious and time consuming manual drawing tasks. With computer-based design systems, the researcher observes that designers no longer have to draw by hand all the images they want; Circle and other basic shapes may be defined by choosing a centre point or corner on the electronic drawing board and simply moving the stylus away from the point. Because the object is defined mathematically it can be resized and moved with the stylus wherever necessary. With this the designer again has no problem with retouching.

Bowman (1989) explains that as computer-aided design is an interactive process, the exchange of information between the designer and the computer has to be made as simple and effective as possible. It is always better to have a natural way of communicating between the participants of the design task. In the researchers view, graphics based data convey more information in less time while pictorial representation helps the designer to make use of his intuitive thinking capability to take better and correct design decisions. This still confirms that interactive computer graphics is one of the most important software tools for computer-aided design. Depending on the type and size of the design problem, the manufacturing processes are reconsidered and in all case the importance of estimating the cost of materials and manufacturing.

A comparative study was done by Sonsino (1991) between the designer and the computer and concluded with the following.

- A designer has creative skills and uses the background knowledge, imagination and judgment to generate ideas but a computer can only carry out systematic reasoning using programmes stored in it.
- A designer can input large amount of information at an instance of time whereas only a sequential input is possible in the case of a computer through input devices like keyboard, mouse etc.
- Information is organized and stored by a designer with little effort whereas large amount of programming work has to be done, to properly organize and store information in a computer.
- The amount of information that a designer can store at a time is less than that compared to a computer. Also the information is lost from a human brain in due course of time. But a computer can store a large amount of information for a long time.
- Production of errors is more frequent in the case of a designer compared to that of a computer; while a designer can respond to erroneous information, a computer cannot.
- The designer has good intuitive analysis capability, whereas the computer has good numerical analysis capability.

A computer can do a large amount of number crunching work fairly accurately in a very short span of time. A designer is very slow in numerical compilations. Designers tend to use short cuts which may affect the quality of the design.

The above set of comparison shows that the designer who is a human being has some capabilities which the computer does not have but a few superior capabilities of a computer which the designer does not possess, which is of great help in the design process.

Matar (1990) opines that, in computer-aided design, the designer and the computer divide the total work and do those activities for which they are best suited. This indicates that the designer and the computer work together, interacting with each other towards the goal of producing better designs.

A similar view by Caires (1984) indicates that, computer aids the designer who uses the computer primarily as a design medium once it is programmed to act as a medium for design. It can be made to respond to whatever has been put into it by the designer. Thus basically, the computer becomes an active medium to carry out design. The use of many other capabilities of computers gives many additional advantages for computer-aided design over the conventional one. This means that to use the computer as a medium, the designer should have good amount of knowledge on hardware and software tools so that the computer system can be effectively used.

Cohen (1985) agrees with the assertion that the conceptualization stage is where the designer generates ideas on the design to meet the functional requirements of the artifact to be designed. The background knowledge and creative skill of the designer play a very important role at this stage. Instead of putting the ideas on the paper, it can be put into a computer using appropriate input devices. At the conceptualization stage the computer is not only used as a medium to store ideas but also it is made to respond to these ideas which help the designer.

In the preliminary design stage, where the selection of configuration and proportioning of components are carried out, the designer again makes use of ideas from previous designs, experience and guidance from standard codes of practices and hand books.

The analysis stage primarily involves transforming the preliminary design model into a motif which depends on the type of design and its requirements.

The graphic capability of the computer provides the designer the necessary assistance in preparing working drawings.

It is evident from the above description that the designer is still on the driver's seat of the designing process. He is assisted by the computer while processing the design information based on instructions received. At every stage of the design sequence, the decisions are taken by the designer and not by the computer. The designer and the computer interact and exchange information from time to time to do the tasks assigned to them for achieving the goal of better design.

1.2. Textile Design Classification and Characteristics

Miller (1991) states that, the nature of a textile pattern is to duplicate it's endlessly, so that the basic image is lost in a sea of repeats. He asserted that, it is also generally assumed that the fine artist works at a level of ambition and in an emotional and intellectual range that most commercial artist just doesn't need. The commercial artist too must always aim to please the market, a temptation to which fine artists are, of course, immune and the textile designer is a link in an industrial production line. What finally appears on cloth has passed through many hands and many processes, and it is the rare designer who has much control over the final outcome.

Schoeser (1989) asserts that, fabric patterns go back to humanity's earliest times and belong to a much older tradition of symbols, where originality is not an issue. In Western fabric design, sources of inspiration include floral, geometrics, conversations, ethnics and art movement and period and styles.

Knight (1994) postulates that the successful textile designer seeks not to devise something never before imagined but to create a variation on one of the pre-existing themes. If a period look has returned to style, its patterns may need a little updating. In the ebb and flow of fashion there is a dance that the designer must somehow be able to follow. The designer must sense the timing of the incoming trend.Just as the individual pattern repeats incessantly over the course of the decades, prints can be thought of as having a temporal dimension. Some motifs follow the tides of politics or of wealth and recession.

Adu-Akwaboa (2001) grouped textile motifs available to textile designer as follows: artificial, natural, floral, animate, inanimate, geometric, traditional objects/symbols, pictorial, themes and proverbs.

Dennis and Jenkins (1991) delineated layout as the arrangement of all the units or elements into a printed usable format. They reiterated that layout is a design for the overall appearance of a printed page, with particular emphasis on the effective positions and arrangement of page elements. Since every trade has its rules and principles the work of the textile designer is governed by certain principle which help the designer achieve the desire results. In line with this, Marshall (1984) suggests four basic principles namely: proximity, alignment, repetition and contrast. These principles are the fundamentals for every designer. The principle of repetition can be related to the principle of rhythm. In this vein, Ruher (2002) suggested that repetition of visual elements throughout the design unities and strengthens the design by uniting them together. She further stated that repetition is very useful on one-design piece or in multi-design documents.

Storey (1989) highlights the fact that, textile designs should have clearly defined colours not in close-tones in order to facilitate easy and faster colour separation. In order to design on the computer and print out professionally enough, the computer resolutions or d.p.i. (dots per inch) or p.p.i. (pixels per inch) should be within150-300 d.p.i. A higher resolution would need bigger computer storage. She further explains the nature of textile designs, for instance, a same design of 12inch square repeat with 8 colours possess speed problem and that no system exists at present which can take a design through to engraving stage so it is important that systems can interface with each other.

The above literature on definitions, classifications and the aspects of designing indicate that design has become an integral part of the production line. Many techniques and processes have been used by designers in producing items for human consumption. Yet there are many other techniques, styles and methods that could be explored to enhance designing, most especially in the field of textiles.

2. Materials and Methods

The study aimed at the manipulation of selected natural objects with the use of computer aided design software (Adobe Photoshop) to suit ethnical and philosophical Ghanaian sense of fabric designing. The study was based on experimental and descriptive methods as well as observation as the main instrument for collecting data. It was observed that the whole natural object or part of it can serve as an inspiration in developing different ideas, most especially when the right effect is applied using appropriate computer-aided rendition techniques. Random sampling and stratified sampling methods were employed in the selection of the natural object for the Adobe Photoshop manipulation. Natural objects were selected according to the laid down categorization and objects of pronounce external features were taken into consideration.

The stratified sampling technique was used because the population falls into distinctly different categories. In view of the fact that natural objects fall into different categories, this method gave the researchers the chance to randomly draw samples from flora, invertebrates (Arthropods) vertebrate animals and inanimate objects.

Category A – Flora (leaves, flowers, fruits, seeds).

Category B – Invertebrates (Crustaceans, Myriaopod, Insects)

CategoryC–VertebrateAnimals(Birds, fishes, Amphibians, Reptiles, Mammals)

Category D – Inanimate objects (Minerals, Shells)

2.1. Stage by Stage Design Process

The designs were produced from photographs of selected objects in Adobe Photoshop which went through the sequential steps that can be epitomized as follows.

- Taking a shot of the object
- Opening and Selecting the image in Photoshop
- Adjusting the resolution and size ofthe image
- Converting the edited photograph into outlines and application of other features.
- Resizing, arranging and defining pattern.
- Colour selection and application of other background effects (textures).

3. Results and Discussions

3.1. Design 1

Figure1 is titled "Nsiananmu"(replacement). It depicts pawpaw leaves in an alternating upside-down pattern. The motifs are arranged in diagonal pattern. It also consists of bubble and textured effects as background. Blue-green, orange, dark brown, yellow and dark ultramarine blue were the colours used. The combination of the colours depicts harmony.

Figure 1: Nsiananmu (Replacement)

The name "Nsiananmu" literally means replacement. It emanated from the Akan proverb"odupon tutu a brofre na esi na nanmu" which can be explained as "the pawpaw tree serves as a replacement when a big tree is no more. When likened to human life, it explains the importance of finding replacement. The design can be suitable for mummy cloth because of its elaborate motifs.

3.1.1. Symbolism

The design can be interpreted as; the need to train and groom successors in every aspect of human endeavour for continuity.

3.2. Design 2

"Responsibility" is the title for the design in Figure2. The design shows half drop arrangement of three leaves used as the unit repeat. The motifs have brighter outlines which separate them from the background showing a rhythmic pattern. The background consists of patchy coloured effect with parallel lines superimposed on it.
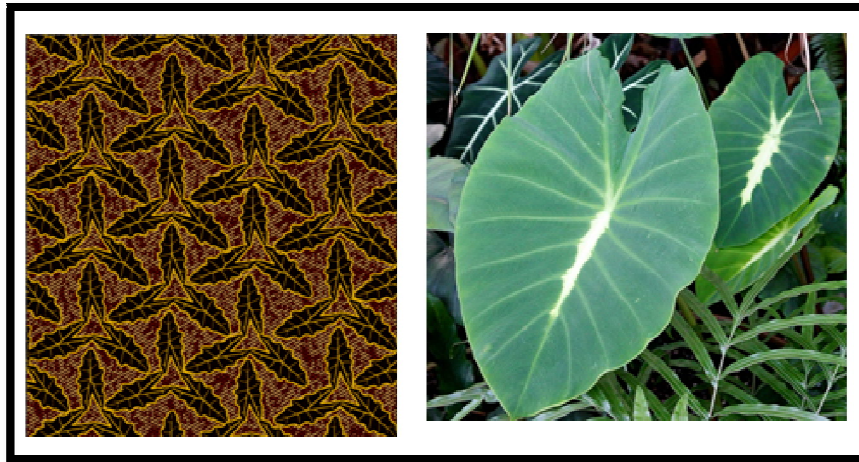

Figure 2: Responsibility

The brown, wine, and yellow reveal a harmonious combination. The three leaves used as unit repeat coming together to form triangles running through the whole design. This can be explained as each leaf is contributing to the triangular formation that runs through the design. The design will be suitable for shirting, upholstery, mummy cloth and curtain.

3.2.1. Symbolism

This pattern can be likened to the role played by every living person on earth regardless of whatever contribution.

3.3. Design 3

The design in Figure 3 is titled "false pleats". The work consists of flowers of two different sizes which run through the whole design in separate repeat patterns.
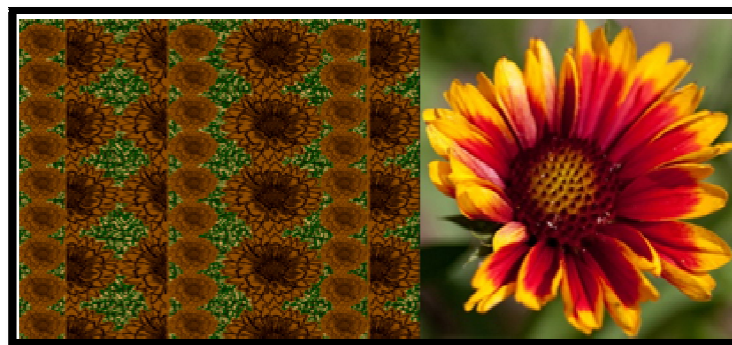

Figure 3: False Pleats

The motifs are given a colour backing with grass-like textures. The colours used are dark brown, orange-brown, dark green and light yellow. The motifs were arranged in a pattern showing pleat effects which give the result of false folds. The design can be suitable for ladies dresses, curtain and upholstery.

3.3.1. Symbolism

The entire design symbolizes the need for prudence in making an assessment before passing judgment.

3.4. Design 4

Figure 4 is the design titled "The flower of love". The work comprises flowers of two different sizes arranged in a vertical meandering pattern. The colours used are green, yellow and orange. Leaves are used as textures and superimposed on orange bubble effect.

Figure 4: Flower of Love

The same effect is seen in the motifs. The green serves as a backing colour for the motifs. Flowers are beautiful, one can present them to another as a sign of love or affection, the leafy green colour is a symbol of life, youthfulness and rejuvenation. The design can be suitable for children's wear because of its brighter colours. It can also be used as a curtain design or table cloth.

3.4.1. Symbolism
This design connotes the beauty of true love from its onset.

3.5. Design5
The work in Figure 5below is titled "Abapa". It consists of a regular repeat of rough effects with a bubble effect. The colours used comprise orange- brown and turquoise blue.
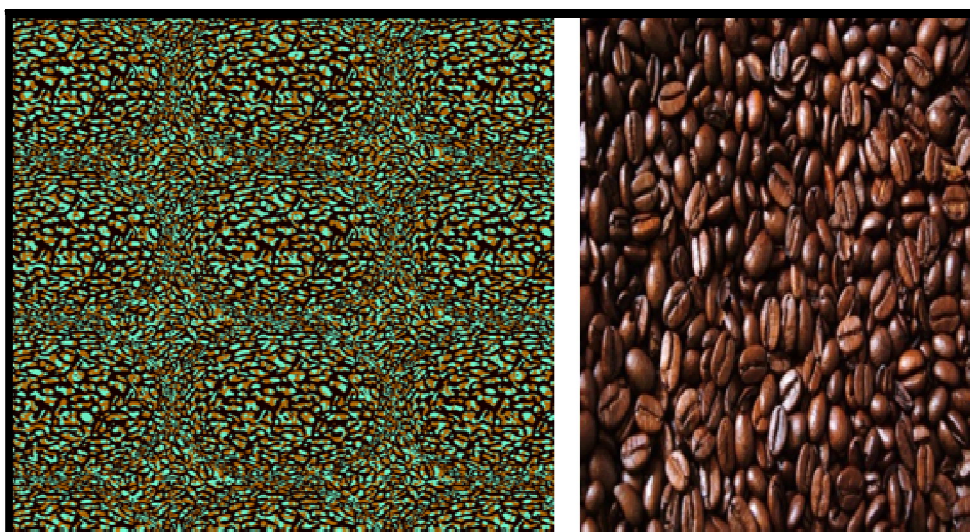

Figure 5: Abapa (Good Seed)

It exhibits a harmonious composition. The design originated from the coffee seed which is one of the cash crops of value. "Abapa" describes the importance of the seeds. The design can be suitable for ladies dress, shirting, curtain, and upholstery.

3.5.1. Symbolism
The design symbolizes the need in cherishing every little good effort towards the achievement of ones goals in life.

3.6. Design6
Figure 6 is titled "concealment". The work consists of thin outline of different ovals and other irregular shapes with overlapping effect. The background shows a camouflage effect of dark green and yellow ochre; the colours depict harmony and rhythm.
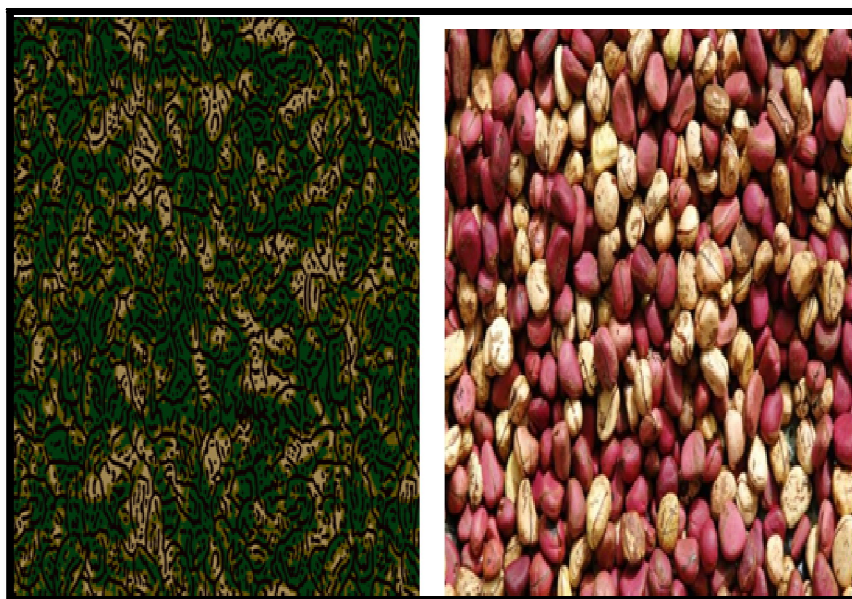
Figure 6: Concealment

The work wasdeveloped from the cola nut; it is one of the edible seeds which are not commonly patronized. The main outlook of the design depicts a camouflage design. It will be difficult to identify when it is closer to objects of somewhat the same colours. The even distributed impressions make it suitable for shirting, ladies wear and children's wear.

3.6.1. Symbolism
Similar to a military camouflage, the design connotes a hidden avidity and a critical perception in our everyday life.

3.7. Design7
The design in Figure 7 is titled "Ahobanbo" (self-protection). It consists of images emanating from the crab. The motifs are arranged in a horizontal undulating pattern. The background of the design consists of a bubble effect and diagonal lines and dots as textures. The colours used are blue, yellow ochre, orange-brown and dark brown.

Figure 7: Ahobanbo (Self-Protection)

The crab is one of the animals that always have its cheliped (claws) ready for an attack. This obviously shows that one should also think about self-protection regardless of where he finds oneself. The design can be used for mummy cloth, shirting, curtains or table cloth for a restaurant because of the form of arrangement of the motifs.

3.7.1. Symbolism
The design symbolically is to remind every person to consciously value self-protection and alertness.

3.8. Design8

Figure 8 is titled "Nkwanpa" (Good Soup). The design is made up of motifs generated from shrimps. It shows alternating colours with a shadow effect. The background comprises lines and dots as textures placed on patchy coloured effect.

Figure 8: Nkwan Pa (Good Soup)

The shrimp is the kind of crustacean which is very tasty when eaten; it is used to enhance the taste of stew and soups during cooking. The design can be suitable for shirting, mummy cloth, curtains and table cloth.

3.8.1. Symbolism

The design typifies cooking ability as a requirement of every married woman in the Ghanaian society.

3.9. Design 9

The design in Figure 9 was produced from the millipede. It bears the title "Apagyade" (legacy). The work shows a full drop arrangement of millipedes as main motifs made up of four smaller shaped millipedes and two big ones. The motifs comprise   a green backing colour.

The background consists of varied circles and triangular shapes on a bubble effect. The colours depict serenity with a rhythmic arrangement of the motifs. The millipede leaves numerous rings like remains when it dies and decomposes.
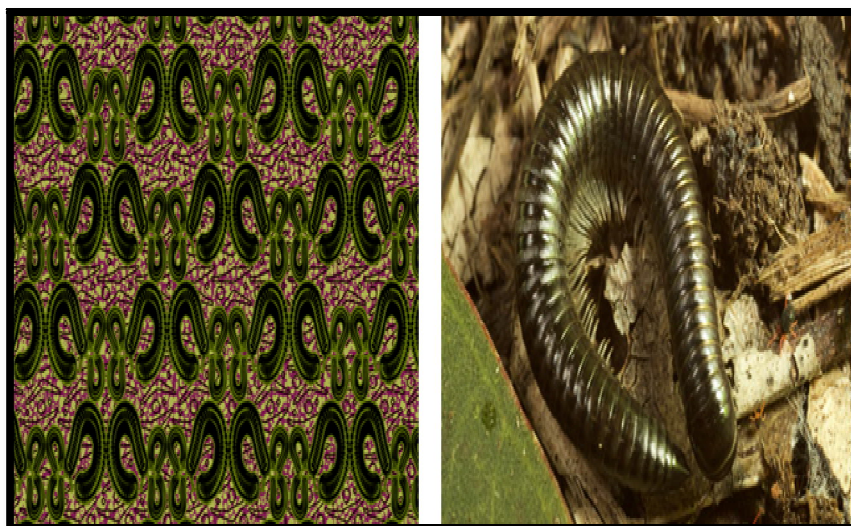

Figure 9: Apagyade (Legacy)

Every individual should have a virtue or one characteristic feature of importance he can be remembered for. The design can be suitable for cloth for the aged, and shirting.

3.9.1. Symbolism

The design means leaving a legacy as an individual for posterity.

3.10. Design10

"Papa nyera da" (Goodness is never lost) is the title of the design in Figure10. The design had its source from a centipede. It comprises a full- drop pattern with green and orange-brown colours as backing colours and black outlines. The background comprises bubble effects, with diagonal and horizontal lines, and varied dots, as textures.
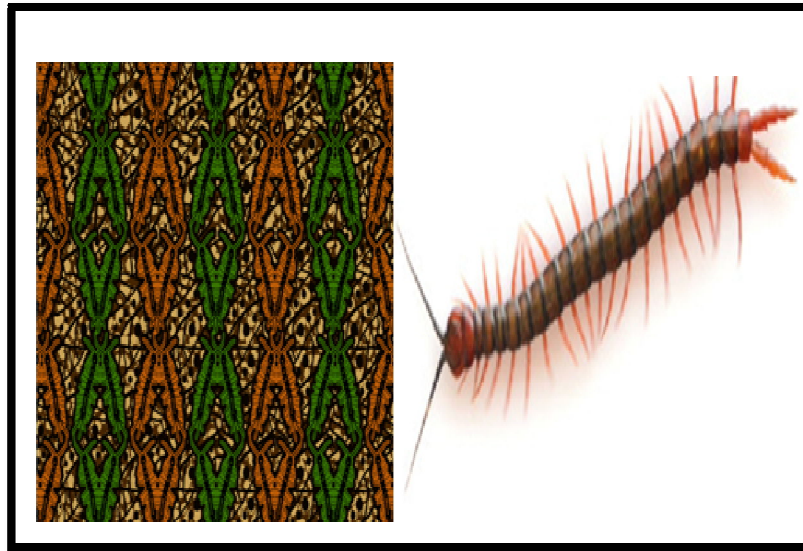

Figure 10: Papa Nyera Da (Goodness Is Never Lost)

The orange-brown, dark green and black colours depict harmony with balance for the motif arrangements; which shows the recurring effect of the motifs. The design is suitable for curtain, mummy cloth and shirting because of its colour.

3.10.1. Symbolism

The design typifies the reciprocation in extending a helping hand to your fellow man.

3.11. Design 11

Figure11 is titled "Akwankyere" (counseling). It shows the images of cockchafer beetles in varied sizes, arranged in vertical meandering pattern. The motifs come with a wine colour backing.
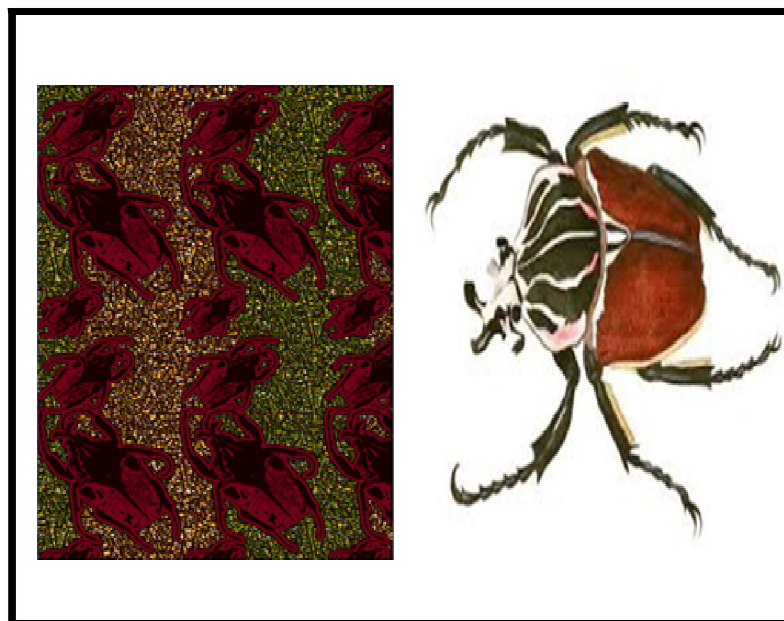

Figure 11: Akwankyere (Counsel)

The colours include wine, dark brown and green depicting harmony. It is normal for the young to learn from the old. It is then important that the leaders or the aged set good examples worthy of emulation. Its colour way makes it suitable for mummy cloth.

3.11.1. Symbolism
The design connotes seeking for a council when perplexed and confused or at a cross road.

3.12. Design 12
"Hold me close" is the title of the design in Figure 12. It shows sexton beetles arranged in horizontal pattern. The motifs are given an alternating pink and turquoise backing.

Figure 12: Hold Me Close

The background shows bubbles in dark green and brown colours with small stars as textures for the background. The motifs are some-what linked together by their limbs. The finished work is suitable for mummy cloth and curtain because of the motifs arrangement.

3.12.1. Symbolism
Up and coming young ones should approach the experienced old people in the society for advice.

3.13. Design 13
Figure 13 is titled "Okodie ntaban" (Eagle wings). The design consists of four birds with two big ones facing each other and the two facing opposite directions. Yellow and light blue-green colours were used as backing colours and for the motifs in alternating order.
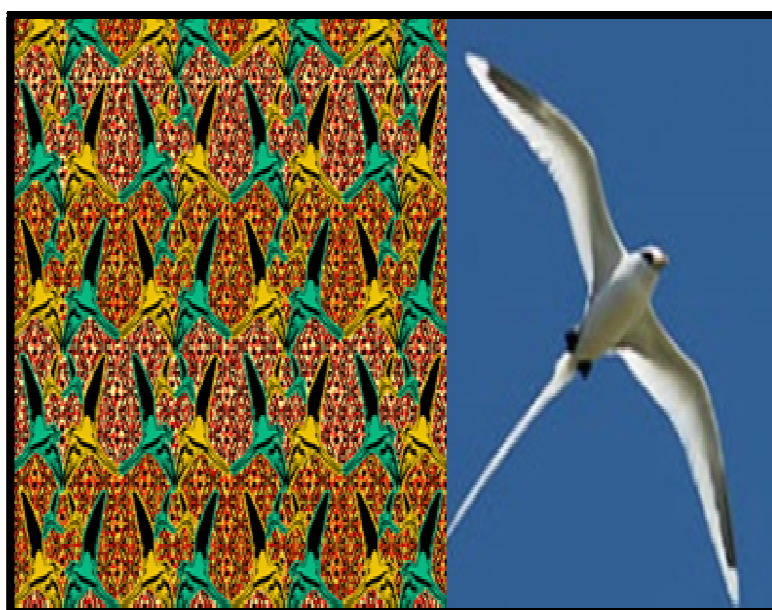

Figure 13: Okodie Ntaban (Eagle Wings)

The background comprises bubble effects in red-orange and alternated with yellow. An outline of the motif has been used for the background textures. The arrangement shows contrast and rhythmic pattern. The eagle with its

strength can fly higher and far. It can be likened to God's care and protection for mankind. The design can be suitable for curtains, table cloth or women's cloth because of the arrangement and colours.

3.13.1.Symbolism
The design with the eagle symbolizes the divine protection from God like the protection of a mother eagle for the young ones.

3.14. Design14
The design in Figure 14 is titled "Asomsem" (whisper). The design was generated from an amphibian called salamander. The main motifs are backed with alternating yellow ochre and dark blue colours with orange-brown bubble effects superimposed on outlined textures.

Figure 14: Asomsem (Whisper)

The motifs comprise two salamanders with their heads coming together. This can be likened to someone who is whispering to another. The colours and the arrangements of the motifs make it suitable for a mummy cloth for the aged, a curtain or upholstery.

3.14.1 Symbolism
The design symbols the prudence in finding a confidant during some critical times of our lives.

3.15. Design 15
Figure 15 has the title "Fa bi sie "(save something). The design consists of curled cow's skin repeating all over it. Blue and yellow ochre are the backing colours in an alternating manner. The motifs are superimposed on a leafy texture and bubble effect respectively.

Figure15: Fa Bi Sie (Save Some)

The skin of a cow can be processed into leather for the production of other items. It is also edible but less nutritious. The design can suit a table cloth for a restaurant, curtain or mummy cloth because of the nature of the motifs.

3.15.1. Symbolism

The design signifies the conscious effort to save and invest part of whatever profit gained through hard work to cater for the future.

3.16. Design 16

The finished work in Figure 16 is titled "Nsa ko na nsa aba" (The hand of kindness goes and the hand of kindness comes). The work exhibits four tortoises of the same sizes repeating through the design. A green backing colour is given to the motifs. The definite regular shapes at the background of the motifs are given dark ultramarine blue and wine colours in an alternating manner.
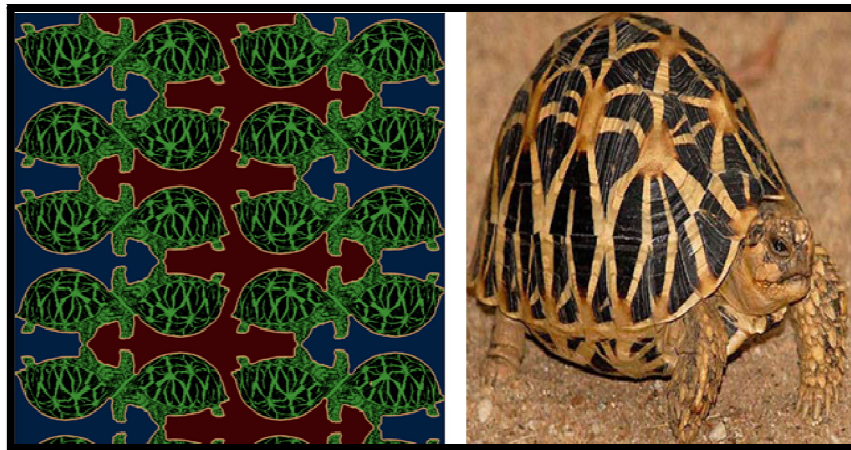

Figure 16: Nsako Na Nsa Aba. (Reciprocation)

A thin outline is given to the motifs to serve as separators between the background and the motifs. The design shows two tortoises with one in an upside-down postures; the one in the upside posture is giving a lifting hand to the other, showing that a hand of kindness one gives to someone else becomes reciprocative in a time to come.
The design can be suitable for shirting, curtain, upholstery, and table mat because of its regular repeat.

3.16.1. Symbolism

This symbolizes the importance of giving a helping hand to the weak, vulnerable and the marginalized in the community

4. Conclusion

This study has revealed that photographs of objects can be adjusted and manipulated for use in textile designing. The assertion is as a result of the use of the various commands provided by the Adobe Photoshop software used for the adjustment and manipulation processes. The success of the research has given room for textile designers to explore in this area so as to create a vast variety of functional designs to suit a specific purpose. The study has also revealed that designing with the computer demands imaginative thinking and creative development. It also gives an insight to the use of the computer-aided programme and its capabilities. The researchers conclude that designs can be produced straight away from objects with the use of computer software without the use of hand drawing tools and methods.

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