ARTICLE

EXPLORING WARP AND WEFT COLOUR ALIGNMENT FOR WEIGHT REDUCTION OF NIGERIAN TRADITIONAL WOVEN FABRICS: A STUDIO EXPERIENCE

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ABSTRACT

Nigerian traditional woven fabrics have excelled locally and internationally because of the weavers' expertise, ingenuity and dexterity in the manipulation of designs. However, an examination of most of Nigerian traditional woven fabrics has revealed that the weavers use the plain weave as a ground weave to hold multiple weft units on one face of the woven fabric. This trend makes them unwittingly subdue the design potentials and possibilities inherent in the ground weave. In fact, this practice can curtail the endless design potentials and possibilities of warp and weft colour alignment. Furthermore, this technique of designing makes many Nigerian traditional woven fabrics heavy and coarse, thus limiting their usage as traditional apparels. This paper, therefore, explores the manipulative possibilities of warp and weft colour alignment for weight reduction of Nigerian traditional woven fabrics. The paper is based on a study that employed a studio exploratory method to identify, select, combine and arrange two contrasting colours in the warp and weft of a two-shaft table loom. Some pattern drafts of warp and weft colour alignment were created and transferred to the two-shaft table loom for the creation of weight reduced samples. The fabric weights of the woven samples were calculated and compared with the weights of some samples of Nigerian traditional woven fabrics to ascertain the lighter in weight. The study found that limitless design potentials and possibilities are inherent in the plain weave used as ground weave by Nigerian traditional weavers. Furthermore, the study established that warp and weft colour alignment can reduce the weight of Nigerian traditional woven fabrics.

Keywords: Exploration, Warp, Weft, Colour Alignments, Traditional, Weaving, Fabric

INTRODUCTION

Woven fabrics all over the world are outstanding visual art forms and expression of cultural heritage that are mainly used for apparels. In Nigeria, traditional woven fabrics are highly valued and cherished because they serve as vital expressions of cultural values. Most cultures in Nigeria have one form of plain woven fabric or another associated with them. Delta, Edo, Abeokuta, Ilorin, Iseyin, Okene, Kano, Bida, Sokoto to mention but few are well-known places in Nigeria for their weaving of traditional fabrics. These traditional woven fabrics are appreciated for their cultural, social and economic importance, which have over the years contributed to the growth and development of Nigeria. Hence, Gyampoh (2003:2) avers that "aso-oke in Yoruba land and Akwete in Igbo land are good examples of traditionally woven fabrics that are of great cultural value to Nigeria and have gone a long way to enhance the socio-cultural image of Nigeria locally and internationally". He further states that other traditionally woven Nigerian textiles of importance are "Popo" typified by the Ibani women of Bonny Island in Rivers State; "wala", a form of aso-oke developed in Ilorin in Kwara State; "rigasaki fulani" identified mostly with the nomadic Fulani ethnic group of northern Nigeria, and "angeh" from Gboko/Jukun, which is traditional to the Tiv people of Benue State. He adds that "Luru" is from Kano state, "sanya onja owu" from Akure/Ekiti, "ikaki" from

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Bonny Island in Rivers State, “akwa-ocha” from Delta State, “otuogwu” from Anambra State and “alaori-olona” from Iseyin in Oyo State. Though recent researches have shown that *otuogwu* is popular, its origin appears to be from Onitsha in Anambra State.

Plate 1: Aso -Oke
Photo: Chibuike Uzoma (2010)

Plate 2: Igbu
Photo: Otasowie Jennifer (2012)

TYPES OF TRADITIONAL DESIGNING TECHNIQUES IN NIGERIA

In Nigeria, traditional weaving of fabrics, there are four main types of designing techniques. These are in-laid, lace or hole, Ikat and warp and weft colour alignment.

IN-LAID DESIGNING TECHNIQUE

Plate 3: Akwete
Pho: Chibuike Uzoma (2010)

This technique of designing emanated from the attempt of traditional weavers to make their fabrics colourful and imbued with cultural values. In fact, there is the need to break the monotony of a one colour woven fabric without any design. As a result of this undertaking, traditional weavers apply other thicker fanciful yarns to create an extra weft float of designs on the face of their woven fabric using the plain weave as ground weave to hold the designs. In some cases, lurex, or *shinny* among traditional weavers, is added to the extra weft float to enhance the aesthetic value of the woven fabric. As Eicher (1976:40) states, “the in-laid technique used by the male weaver on horizontal looms for executing patterns in the woven fabrics is similar to that of the vertical looms”. According to her, the output of an individual weaver depends on his degree of skill, dexterity, industry and type of yarn in use.

In the same vein, Ademuleya (2002:70) calls the in-laid design supplementary weft float design. He explains that this design is achieved by introducing one or more supplementary single heddle with a shed stick to create floating in-laid patterns. Moreover, the weft float patterning is useful in creating images that are geometric representation of common objects, some of which are derived from religious objects or symbols usually with rayon and lurex yarn on the surface.

HOLE OR LACE DESIGNING TECHNIQUE

Plate 4: Lace or Hole Design
Photo: Chibuike Uzoma (2010)

The hole or lace designing technique, as the name implies, comprises weft float and holes positioned on the woven fabrics as pre-planned by the weaver with the aid of a metal tool. In this technique, the traditional weaver tactfully manipulates the warp and weft to give it a lace effect because of the holes randomly spotted on the woven fabric. This type of designing technique involves fabric embellishment with woven open work that has supplementary different weft float weave motifs. These supplementary weft-floats with different fanciful yarns make the woven fabric colourful and texturised. In fact, this designing technique could be traced to the early 1970s post-bellum Nigeria when there was ban on the importation of some goods and textiles. The Nigerian traditional weavers seized this challenge to create woven fabrics as a substitute for lace materials. Thus, the holes complement the supplementary weft float thereby enhancing the aesthetic value of the woven fabrics.

Plate 5: Lace & In-Laid Design
Photo: Chibuike Uzoma (2010)

THE IKAT DESIGNING TECHNIQUE

The Ikat designing technique has to do with tying and dyeing of the warp yarns or weft yarns before interlacing takes place to create a woven fabric. In this situation, traditional weavers attempt to deviate from using the yarns in their original colours by giving them a subtle dyeing before arranging the loom for weaving. This assertion is in line with Brown (1976:76) who states that “Ikat means the warp or weft (or both) is tie-dyed before being woven”. According to her,

the tie-dyed design gives a slightly blurred effect in the weaving since the threads are not in absolutely perfect alignment after they are woven. She further proffers that this old technique is used in Nigeria to produce quite intricate designs in a structure of plain weaving. Similarly, Picton and Mack (1989:147), talk about resist yarn dyeing before it is woven and technique known as “Ikat”. They state that the technique involves several lengths of yarn that are tied together at intervals before being immersed in the indigo and where the yarn is tied. The dye is resisted to produce lengths of yarn, which change colour at intervals. They further explain that Hausa, Yoruba and Northern Edo weavers employ “Ikat-dyed” yarn in some of their patterns of warp stripes.

However, Cooksey (2011:17) opines that “Ikat” derived its name from a Malaysian word Merigika, meaning to bind which refers to the technique of dyeing that involves the wrapping of a section of gathered yarns to form a dye-resistant area. She further states that when the technique is incorporated in weavings, with the attenuation of colour created during the dyeing process creates a soft-edged pattern that forms a pleasing contrast to the hand-edged patterns of evenly dyed-yarns. She adds that the process originated from Indonesia but is evident throughout Asia, the Middle East, and Africa. She finally contends that, although Ikat is applied widely in West Africa, the weavers of Cote d’Ivoire and Nigeria are well known for exploiting this technique. The Yoruba, in particular, place them in the category of *aso alaro*, meaning cloth appropriated from rites and ceremonies.

Plate 6: A procession of men (Ugbamas) in the Igogo ceremony wearing wrappers (Ipanmeta) with Ikat patterns Owo Nigeria
Courtesy: Robin Poynor, Scanned 2012

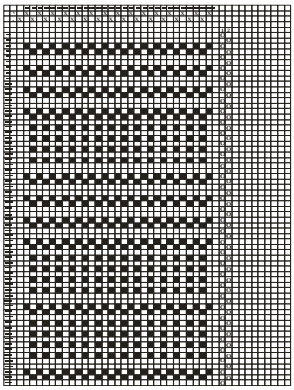
WARP AND WEFT COLOUR ALIGNMENT DESIGNING TECHNIQUE

The warp and weft colour alignment technique of designing has to do with the manipulation of contrasting colours in the warp and weft to produce woven fabrics with aesthetic value by traditional weavers. Under this technique, the weaver aligns or arranges two or more contrasting colours of yarns to portray an exciting colour and weave effect with variety of patterns. This technique is exciting because the patterns depend solely on the colours as predominant decorative features and not on the character of the weave for their ornamentation. Thus, the more the level of creativity in the manipulation of yarns alignment, the more exciting the emerging patterns.

This designing technique is advantageous because the weaver does not need to superimpose other fanciful yarns on the face of the woven fabric to enhance its aesthetic quality. Instead, the alignment of coloured yarns tends to enhance the aesthetic quality, thus reducing the weight of the traditional woven fabrics and making them more functional. Furthermore, the nature of warp and weft colour alignment enables the weaver to record the technical details of the woven fabric for replication purposes.

CREATION OF SOME PATTERN DRAFTS AND THEIR WOVEN SAMPLES

The preparatory stage of the technical details that precede every woven fabric is called pattern drafting. Pattern drafting enables the weaver or designer to have a fore knowledge or to forecast and visualise the intended fabric, that is, the patterns can be worked out accurately on point paper (graph paper) before the weaver or designer decides how to set the loom up. In fact, it enables the weaver to keep an accurate record of all her works and engenders a deeper understanding of the weaving process. Pattern drafting is advantageous because it enables the weaver to understand and develop original designs for the production of woven fabrics.



X = Warp pattern draft. O= Weft lifting plan.

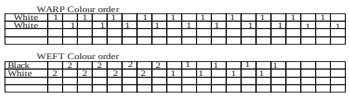
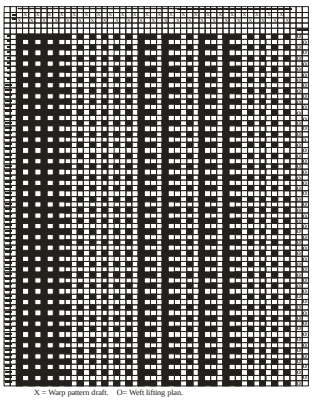


Figure 3.7



X = Warp pattern draft. O= Weft lifting plan.

WARP Colour order

Brown	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Yellow																							

WEFT Colour order

Brown	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Yellow																							

Figure 3.8

This pattern's drafts are thereafter transferred onto the two-shaft table loom for the production of woven samples based on the specification of the drafts. The weaving preparation begins with the identification and selection of suitable yarns to be duly used for the weaving proper. This is important because, as aptly stated by Lord and Mohamed (1976:32), "the selection of suitable yarns and the preparation of yarns for weaving have a considerable influence upon the efficiency with which the operation itself can be performed". On the assurance of the yarns to be used, the laying of the warp begins based on the specifications of the pattern drafts.

Plate 7: Acrylic Yarns, Scissors & Tape
Photo by Theresa Osaigbovo (2010)

Plate 8: Cotton & Synthetic Yarns
Photo by Theresa Osaigbovo (2010)

During the process of laying the warp, a cross pattern takes shape. This up-and-down movement, which is peculiar to the movement of warp yarns in a plain weave, creates a form of cross, thereby lifting alternate warp yarns to form a space (shed) through which the shuttle carrying the weft yarn can pass. The cross is normally secured with the insertion of the shed stick.

Plate 9: Laying of the warp
Photo: Chibuike Uzoma (2010)

Plate 10: Insertion of Shed Stick
Photo: Chibuike Uzoma (2010)

Insertion of the shed stick is closely followed by the chaining of the warp yarns to enable the weaver to manage the length of the warp.

Plate 11: Chained warp ends
Photo: Chibuike Uzoma (2010)

The chaining up is followed by dressing of the loom, which has to do with passing the warp yarns through appropriate channels of the loom for weaving to take place. This is a long process of fixing the warp yarns at the back bar of the loom, disengaging the heddles or harnesses and raddling which has to do with spreading out of warp ends so that they are in their correct number and position per centimetre (warp sett). Beaming and tensioning, engagement of heddles or harness drafting on the loom or heddling, denting and tying up are all stages involved in the dressing of the loom before weaving commences in earnest.

Plate 12: Raddling
Photo: Chibuike Uzoma (2010)

Plate 13: Raddling
Photo: Chibuike Uzoma (2010)

Plate 14: Heddling
Photograph: Chibuike Uzoma (2010)

Plate 15: Denting
Photograph: Chibuike Uzoma (2010)

Plate 16: Raddling
Photograph: Chibuike Uzoma (2010)

Plate 17: Tying up
Photo: Chibuike Uzoma (2010)

Plate 18: Weaving Process
Photo: Chibuike Uzoma (2010)

After the long process of dressing the loom, the weaving of the woven samples begins. Some of the woven samples are as shown below:

Pattern draft

Woven samples

Pattern draft

Woven samples

CALCULATED FABRIC WEIGHTS

This part of the study deals with the procedure for the calculation of weights of four woven samples to ascertain the weights of the different woven fabrics. This is to determine the designing technique that produces the lightest fabric.

SAMPLE A

Sample A is a cotton traditional woven fabric with multiple-weft units of patterning. This sample presents in-laid-designs. Specifically, there are ten samples of 10cm x 10cm per sample for the calculation of the weight and the details are as follows:

10cm x 10cm in-laid-design

10cm x 10cm in-laid-design

Name of fabric	-	Sanyan
Size of Fabric	-	10cm x 10cm
Area of Origin	-	Akure/Ekiti
Photograph	-	Abi-Bezam N.
Ends per centimetre (e.p.c)	-	24
Picks per Centimetre (p.p.c.)	-	24
Picks per centimetre (p.p,c) in-laid design	-	8
Warp colour order	-	2 orange 3 cream
Weft colour order	-	All cream
Yarn type	-	Cotton
Fabric weight	-	350 gm/m^2

SAMPLE B

Sample B is a cotton fabric with warp and weft colour alignments for pattering technique without multiple-weft. Specifically, there are ten samples of 10cm x 10cm per sample for the calculation of the weight and the details are as follows:

10cm x 10cm cotton fabric without multiple-weft

Name of fabric	-	Cotton warp and weft colour alignments
Size of Fabric:	-	10cm x 10cm
Area of Origin	-	Delta State University, Abraka
Textile Designer	-	Osaigbovo Theresa Uvbi (The Researcher)
Photograph	-	Abi-Bezam N.
Year	-	2011
Ends per centimetre (e.p.c)	-	16
Picks per Centimetre (p.p.c.)	-	16
Warp colour order	-	28 Red, 2 Blue 2 Red (6x), 2 Blue 16 Red (Repeat)
Weft colour order	-	All Red
Yarn type	-	Cotton
Fabric weight	-	300 gm/m^2

SAMPLE C

Sample C represents a research sample of an acrylic fabric with warp and weft colour alignment technique of pattering without multiple-weft units. In all, there are ten samples of 10cm x 10cm per sample for the calculation of the weight and the details are as follows:

10cm x 10cm without multiple-weft units

Name of fabric	-	Acrylic warp and weft colour alignments
Size of Fabric	-	10cm x 10cm
Area of Origin	-	Delta State University, Abraka, Nigeria
Textile Designer	-	Mrs. Osaigbovo Theresa Uvbi
Photograph	-	Abi-Bezam N.
Year	-	2011
Ends per centimetre (e.p.c)	-	16
Picks per Centimetre (p.p.c.)	-	16
Warp colour order	-	2 Blue, 2 Red
Weft colour order	-	2Blue, 2Red
Yarn type	-	Acrylic
Fabric weight	-	340.000 gm/m^2

SAMPLE D

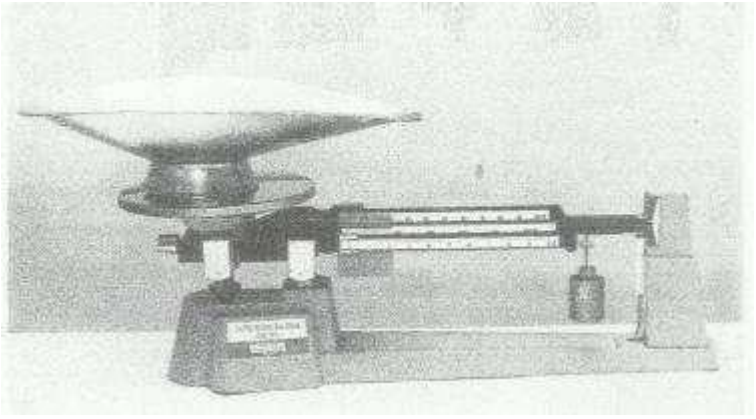
Sample D presents an acrylic fabric with warp and weft colour alignment technique of pattering without multiple-weft units. For calculation of the weight, ten samples of 10cm x 10cm per sample are presented and the details are as follows:

Name of fabric	-	Acrylic warp and weft colour alignments
Size of Fabric	-	10cm x 10cm

Area of Origin	-	Delta State University, Abraka, Nigeria
Textile Designer	-	Mrs. Osaigbovo Theresa Uvbi
Photograph	-	Abi-Bezam N.
Year	-	2011
Ends per centimetre (e.p.c)	-	4
Picks per Centimetre (p.p.c.)	-	4
Warp colour order	-	1 Black, 1 Red
Weft colour order	-	1Black, 1Red
Yarn type	-	Acrylic
Fabric weight	-	290 gm/m^2

CALCULATION OF THE MEAN OF TEN SAMPLES OF SQUARE OF PIECES OF 10CM X 10CM WOVEN FABRICS

In calculating the weights of these samples, ten (10) samples of square pieces of 10cm x 10cm were cut from each type of the woven fabric. Each of the specimens was weighed using the Triple Beam Balance MD 2610 capacity gram scale in the Department of Chemistry of Delta State University, Abraka:



Triple Beam Balance

The mean of the ten (10) results for each particular fabric was calculated and the resultant weight converted to grams/metre^{2-} (gm/m^2).

Egonwa (2012:46) defines a mean as “a statistical measure or tool used to determine the average variable or scores in a given raw or group data”. According to him, “it is the total scores of a given number which is divided by the number of variables”. Hence in this paper, the Mean is = Average value of a reading (this is the average of all the readings and is obtained by dividing the total by the number of readings).

$$n = \frac{n_1 n_2 n_3 n_4 n_5 n_6 n_7 n_8 n_9 n_{10}}{h}$$

$$n = \frac{\Sigma n}{h}$$

Where

n	=	Average or mean
n	=	Individual reading
h	=	Total Number of Reading
Σ	=	Summation (Sum of)

In the light of the above, the calculated weight of the woven samples are as follows:

WOVEN SAMPLE B

Calculated Weight

Sample	**Weight in (gm/cm)**
1	3.0000
2	3.0000
3	3.0000
4	3.0000
5	3.0000
6	3.0000
7	3.0000
8	3.0000
9	3.0000
10	3.0000
n	30.0000
	= 3.0000 gm/cm
	= (3.0000 x 100)
	= 300.000 gm/m^2

:. Weight of one (1) metre square = 300gm/m^2

WOVEN SAMPLE C (40 TEX) FABRIC – 2 PLY WARP 2 PLY WEFT

With Warp and Weft Colour Alignments for Patterning Without Multiple Weft Unit (Research Sample 1)

Sample	**Weight in (gm/cm)**
1	3.4000
2	3.4000
3	3.4000
4	3.4000
5	3.4000
6	3.4000
7	3.4000
8	3.4000
9	3.4000
10	3.4000
n	34.0000
	= 3.4000gm/cm
	= (3.4000 x 100)gm/m^2
	= 340.000gm/m^2

:. Weight of one (1) metre square = 340gms/m^2

WOVEN SAMPLE D (40 TEX) FABRIC – 1 PLY WARP 1 PLY WEFT

With Warp and Weft Colour Alignments for Patterning without Multiple Weft Unit (Research Sample 2)

Sample	**Weight in (gm/cm)**
1	2.9000
2	2.9000

3		2.9000
4		2.9000
5		2.9000
6		2.9000
7		2.9000
8		2.9000
9		2.9000
10		2.9000
n		29.0000
	=	2.90000gm/cm
	=	(2.90000 x 100)gm/m^2
	=	290.0000

:. Weight of one (1) metre square of fabric = 290gm/m^2

:. Weight of one (1) metre square of fabric = 290gm/m^2

FINDINGS

The study has revealed that there are endless design potentials and possibilities inherent in the plain weave used as ground weave by Nigerian traditional weavers to hold their multiple weft float designs on the face of the woven fabric.

Moreover, the study has brought to the fore the fact that the in-laid designs on one face of most Nigerian woven fabrics have contributed to the excess weight and coarse texture of the fabrics. In the same vein, the results of the calculated weights of the woven samples reveal that the warp and weft colour alignment technique of patterning without multiple weft floats can reduce the weight of Nigerian traditional woven fabrics.

CONCLUSION

Based on the study results, there is a need for further exploration to harness the design potentials and possibilities inherent in the plain weave used as ground weave by Nigerian traditional weavers. This exploration and harnessing should be overemphasized as it could reduce the weight and texture of the fabric. On the whole, the study findings could serve as a source of information and inspiration for traditional weavers, studio artists, small and medium scale textile industries and skill acquisition centres in Nigeria and other parts of the world where such crafts are in the vogue.

REFERENCES

Ademuleya, B. A. (2002). *Continuing appreciation of the old Aso-Oke types among the Yoruba of Ondo.* Ph.D. Dissertation. University of Ibadan, Oyo State, Nigeria.

Brown, R. (1979). *The weaving, spinning and dyeing.* Book, First Published in Great Britain by Routledge and Kegan Paul Ltd.

Cooksey, S. (2011). *Bark and raffia cloth interpreting indigenous prestige in Africa interweave-textile diasporas.* Samuel P. Harn Museum of Art, University of Florida.

Egonwa, O. D. (2012). *Research methods in visual arts.* Ababa Press Ltd. Sango, Ibadan.

Eicher, J. B. (1976). *Nigerian handicraft textiles.* University of Ife Press, Ile-Ife, Nigeria.

Gyampoh, A. (1999). Contemporary adaptation of the Nigerian traditional textile industry in Delta State. *First Rhythms: Society of Nigeria Artist,* Delta State Chapter 1999 Independence Art Exhibition, October, 28-Novermber 1st 1999.

Gyampoh, A. (2003). *A socio-cultural assessment on the use of imported textiles as home furnishings among Nigerians.* A Research Proposal on the use of imported textiles as home furnishings among Nigerians. A Research Proposal for the Degree of Doctor of Philosophy (Industrial Design). Department of Industrial Design, School of Environmental Technology, Akure.

Lord, P. R. and Mohamed, M. H. (1976). *Weaving: Conversion of yarn to fabric.* Merrow Publishing Co. Ltd., Durban, England.

Picton, J. and Mack, J. (1989). *African textile, looms, weaving and design.* Published for the Trustees of the British Museum Publications Limited.