# Development of Nakshi Kantha Motifs through CAD and their Adaptation on Apparel using Digital Printing

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## Abstract

*The word Kantha means patched clothes. Kantha evolved out of necessity to drape or protect against cold. Kantha in Sanskrit means rags. In that era, thread and cloth were not easily available to common people so women of Bengal started to use over used saris or dhotis by stitching them up. They used the strand of thread from the colorful border of the saris and started to make simple designs with them. An initiative has been taken for exploring the possibility of modification of traditional motifs of Nakshi Kantha. The concept behind the theme was to create new range of textile designs by maintaining the beauty and originality of traditional embroidery. Motifs suitable for use through textile ornamentation, present on the traditional samples were identified and collected through secondary data. The motifs derived from the traditional samples were then categorized and modified using CAD. Each design was adapted into three different layouts for women's kurta. The most preferred design layout in each category was then digitally printed and the consumer's acceptability of the printed product was evaluated.*

## Keywords

CAD, Kantha Embroidery, Contemporization, Digital Printing, Apparels.

## 1. Introduction

India has a long history associated with incredible and inspiring embroidery. Young girls were taught to embroider from a young age, usually at around six years old and traditional after they lost their first tooth. They were taught not only so they could acquire practical skills, but also as a form of education and so they could learn to observe the world full of beautiful plants and animals by drawing and stitching them[5.]

Bengal has an old tradition of Kantha embroidery. Kantha Embroidery of Bengal has enjoyed international repute for the fineness of the muslins woven in Dacca. With exquisite names like Running Water these were woven plain or patterned with thicker threads of white cotton providing opaque patterns on the fine ground [2].

It is a form of embroidery often practiced by rural women. The traditional form of Kantha embroidery was done with soft dhotis and saris, with a simple running stitch along the edges [5]. The embroidered cloth had many uses including women's shawls and covers for mirrors, boxes, and pillows. In the best examples, the entire cloth is covered with running stitches, employing beautiful motifs of flowers, animal v/s birds and geometrical shapes, as well as themes from everyday activities. The stitching on the cloth gives it a slight wrinkled, wavy effect [2].

Contemporary Kantha is applied to a wider range of garments such as saris, dupatta, shirts for men and women, bedding and other furnishing fabrics, mostly using cotton and silk. Modern Katha-stitch craft industry involves a very complex multi-staged production model.

The present study was undertaken to develop modify popular motifs of Nakshi Kantha, folk embroidery of Bengal through CAD and arrange them in a layout suitable for women's kurta.

## 2. Methodology

### 2.1. Collection of motifs

The motifs of Nakshi Kantha were sourced from various secondary sources and the most popular five motifs were selected viz. lotus, tree of life, *kalka*

(paisley), animal motif (elephant) and palanquin (Figure 1).



*Lotus*

*Kalka* - Paisley

*Tree of Life*

*Animal-Elephant*

*Palanquin*

**Figure 1. Selected Motifs of Nakshi Kantha**

## 2.2. Development of modified motif

The selected motifs of Nakshi Kantha were modified and adapted to create additional motifs (Figure 2). The designing into contemporary form was done through CAD software i.e. Corel Draw (Version X-8).



*Modified Motif-
Lotus*

*Modified Motif-
Tree of Life*

*Modified Motif-
Kalka* - Paisley

*Modified Motif-
Elephant*

*Modified Motif-
Palanquin*

**Figure 2. Modified Motifs of Nakshi Kantha**

## 2.3. Development of layouts for women's kurta

The five modified motifs were arranged in three different layouts using the Corel Draw software (Version X-8). The design was developed either by using the complete design or by using the component motifs. A total of 15 designs were developed (i.e. three different layouts for each modified motifs) for the women's kurta.

## 2.4. Evaluation of the developed designs

The developed design layout was evaluated by a sample of 60 respondents including staff members in the field of textiles, students (both textile and non-textile background) and boutiques owners/shopkeepers for the selection of 5 most preferred layouts (one in each category). The developed designs were in bi colour (black and white) as the colour plays an important role in the overall aesthetic appeal of the product, the responses from respondents might have affected their choice. The attributes for evaluation were arrangement/ placement of the design, appropriateness or suitability of designs for particular product and overall aesthetic appeal. A five point ranking proforma was used for this purpose. The designs were scored as 1, 2, 3, 4 and 5 corresponding to average, fair, good, very good and excellent respectively.

## 2.5. Development of digitally printed products and their cost determination

The five selected design layout (one from each category) was applied on women's kurta using Digital Printing. The cost of each prepared product was calculated separately on the basis of raw material/fabric used, digital printing of the fabric, design conversion charges and profit margin. A total of 25 per cent profit margin was added in the calculated cost for getting sale price. The cost of designing done through computer was not included in the actual cost.

## 2.6. Acceptability of the developed product

The five prepared digitally printed kurtas were shown to a sample of 30 respondents including staff members in the field of textiles, students (both textile and non-textile background) and boutiques owners/shopkeepers) to assess the acceptability of the

developed products. A five point ranking proforma was used to check the acceptability of the developed products. The attributes considered for ranking were fabric appeal, neatness, clarity of design, suitability of design and overall aesthetic appeal. Scores 1, 2, 3, 4 and 5 were given to the products corresponding to average, fair, good, very good and excellent respectively.

## 2.7. Analysis of data

Weighted score mean and rank method was used to find out preference of the respondents for the motifs developed and arrangement of motifs in three different layouts for each motif.

Two-way ANOVA technique was used to analyze whether there exist any significant difference among the different layouts of the design developed and the selected attributes on different layouts. Similar ANOVA technique was also used to analyze the difference in the acceptability of the different developed products.

## 3. Results and Discussions

### 3.1. Evaluation of the developed designs

The developed designs were evaluated visually for the selection of five most preferred designs for digital printing and the results are reported in Table 1.

For the design category A, the most preferred layout was A3 with the average mean of 3.99 (Rank I). The layout B1 from the design category B, scored the maximum with an average mean of 3.71. The selected layout from the category motif C was C1 since it was ranked first with the average mean of 4.34. Among the layouts from the category motif D, D1 scored highest with an average mean of 4.07. Layout E3 (average mean 4.04) from the category motif E got first preference and so it was selected for product development (Figure 3).

In all the cases, the statistical analysis indicated that there is a significant difference among the three different layouts (P> 0.05) whereas different attributes had no significant difference on the layouts (P<0.05).

### 3.2. Product development and cost calculation

The selected layouts were printed on women's kurta using digital printing (Figure 4) and the costs of the prepared women's Kurta were calculated. It was

found that the cost of all the five kurtas were same because of the use of similar fabric and also the digital printing charges, which was calculated on per meter basis. Table-2 shows that the sale price of each Kurta as it was calculated.

**Table 1. Visual Evaluation Scores of Developed Layout for the Modified Nakshi Kantha Motif**

| Design No. | Arrangement of the Motif | | Appropriateness/ Suitability of Design for Women's Kurta | | Overall Aesthetic Appeal | | Avg $\bar{x}$ | Rank |
|---|---|---|---|---|---|---|---|---|
| | WMS | $\bar{x}$ | WMS | $\bar{x}$ | WMS | $\bar{x}$ | | |
| **Design A (Lotus)** | | | | | | | | |
| A1 | 204 | 3.40 | 226 | 3.77 | 211 | 3.52 | 3.56 | II |
| A2 | 211 | 3.52 | 203 | 3.38 | 214 | 3.57 | 3.49 | III |
| A3 | 235 | 3.92 | 236 | 3.93 | 247 | 4.12 | 3.99 | I |
| **Design B (Kalka-Paisley)** | | | | | | | | |
| B1 | 216 | 3.60 | 230 | 3.83 | 221 | 3.68 | 3.71 | I |
| B2 | 190 | 3.17 | 178 | 2.97 | 189 | 3.15 | 3.09 | III |
| B3 | 190 | 3.17 | 192 | 3.20 | 202 | 3.37 | 3.24 | II |
| **Design C (Tree of Life)** | | | | | | | | |
| C1 | 259 | 4.32 | 260 | 4.33 | 262 | 4.37 | 4.34 | I |
| C2 | 188 | 3.13 | 187 | 3.12 | 180 | 3.00 | 3.08 | II |
| C3 | 187 | 3.12 | 173 | 2.88 | 192 | 3.20 | 3.07 | III |
| **Design D (Animal-Elephant)** | | | | | | | | |
| D1 | 238 | 3.97 | 251 | 4.18 | 243 | 4.05 | 4.07 | I |
| D2 | 205 | 3.42 | 193 | 3.22 | 205 | 3.42 | 3.35 | II |
| D3 | 180 | 3.00 | 204 | 3.40 | 191 | 3.18 | 3.19 | III |
| **Design E (Palanquin)** | | | | | | | | |
| E1 | 204 | 3.40 | 217 | 3.62 | 210 | 3.50 | 3.51 | II |
| E2 | 193 | 3.22 | 194 | 3.23 | 188 | 3.13 | 3.19 | III |
| E3 | 254 | 4.23 | 229 | 3.82 | 245 | 4.08 | 4.04 | I |



A3
(Lotus)

B1
(Kalka-Paisley)

C1
(Tree of Life)

D1
(Animal-
Elephant)

E3
(Palanquin)

Figure 3. Selected Layouts

Table 2. Cost of Digitally Printed Women's Kurta

| Items | Consumption (mts.) | Rate (Rs.) | Value (Rs.) |
|---|---|---|---|
| Cut Length of Modal Fabric | 2.5 | 150/meter | 375/- |
| Design Conversion Charges | --- | 50 | 50/- |
| Digital Printing Charges | 1.25 | 350/meter | 437.5/- |
| Actual Cost | | | 862.5/- |
| Profit (25%) | | | 215.6/- |
| Sale Price | | | 1078.1/- |



A3      B1      C1



D1

E3

Figure 4. Digitally Printed Women's Kurta

## 3.3. Acceptability of the Developed Product

This section comprises the distribution of the respondents according to their preference for the developed product according to the decided attributes. According to the average mean of all the attributes of five different designs, the most preferred design is Design C1 (Tree of Life) with the average mean of 4.75. The second most preferred design was A1 with mean of 4.41 (Lotus), followed by design D1 (Animal-Elephant), design B1 (*Kalka*/Paisley) and design E3 (Palanquin) with average means of 4.28, 4.19 and 3.96 respectively, the results of which is clearly depicted in Figure 5.

The statistical analysis between the two factors, i.e. different printed products and the attributes, it was found that there is a significant difference among acceptability of the five different printed products ($P > 0.05$) but different attributes had no significant difference on its acceptability ($P < 0.05$).

Anjum[1] had done a similar study in a direction of creating innovative motifs using CAD technology and developing various apparel items using screen printing. The results of the study also highlights that all the printed apparels were highly appreciated.
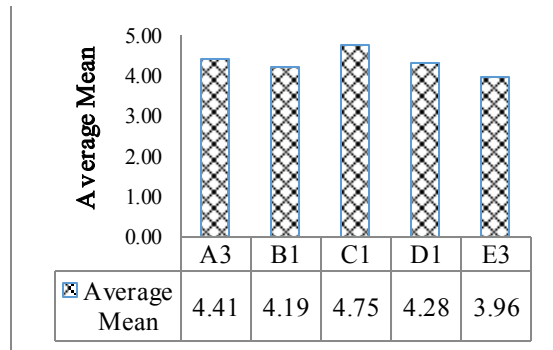
| | A3 | B1 | C1 | D1 | E3 |
|---|---|---|---|---|---|
| Average Mean | 4.41 | 4.19 | 4.75 | 4.28 | 3.96 |

**Figure 5. Average Mean Digitally Printed Kurta**

## 4. Conclusion

The designs prepared by CAD were successfully applied on women's kurta using digital printing and all the prepared articles were highly appreciated and well accepted with regards to visual evaluation and cost effectiveness.

The present study was thus an attempt to introduce the modified designs of traditionally restricted Kantha embroidery, to new textile experimentation using Computer Aided Designing. It will be an effort to reveal to the world the unexplored treasures, the light of the day, by introducing the newly developed modified designs from the Plethora of collections of Nakshi Kantha and to open new avenues to revolutionize them to the 'Design-Fashion' world.

The study would be a step forward to the integration of designs and preserve these designs by developing a repository, which could be accessed as and when needed.

## 5. References

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