

## Design Development of Innovative Card Weaving Module

Meenu Srivastava\* and Ranvir Kaur

Department of Textiles & Apparel Designing, College of Home Science, MPUAT, Udaipur, India.

**Correspondence Address:** \*Dr. Meenu Srivastava, Department of Textiles & Apparel Designing, College of Home Science, MPUAT, Udaipur, India.

### Abstract

Card or tablet weaving is a very ancient and widespread off-loom weaving method of weaving narrow bands of fabric using flat cards with holes punched in them.<sup>1</sup> Card weaving is a simple, easy weaving method, but designing patterns is typically laborious and requires knowledge, experience, and skill. Traditional card weaving isn't really suitable for 3-holed, 5-holed and 6-holed weaves. Further, conventional technique of card weaving is not handy to control the tension created in warp threads. In view of the difficulty encountered in weaving large width articles and also controlling cards of multiple holes in creating textiles products with more structural variations, the present study was conducted on design development of innovative card weaving module and judging its efficacy for rural community.

**Keywords:** Design, development, card, weaving, module

### Introduction

Card weaving” or “tablet weaving” as it is sometimes called, is very interesting and ingenious little craft with many practical possibilities. It is a true form of weaving, as technical as weaving on a large loom, and though limited to the making of narrow fabrics.<sup>2</sup> Tablet woven bands are known to have been made in Europe from the Bronze Age up until medieval times, and they are still made in parts of the world such as Turkey and Pakistan. The development of the loom allowed the use of flexible fibres such as wool, cotton and linen etc.<sup>3</sup> From the times immemorial, the village and cottage crafts seemed to have played a pivotal role in the social and economic life of our society with introduction of appropriate technology, market orientation and encouraging a

concept of “self help” among the primary producers. Hand weaving plays a very important role in generating productive employment in the rural areas.<sup>4</sup> Tablet weaving is a method of weaving strong, narrow, decorative bands. The equipment required is very cheap and simple, yet the range of possible patterns is immense. Uses of tablet-woven bands included the decoration of clothing, and use as belts and straps.<sup>5</sup>

These decorative adornments are found in most cultures throughout history, which are expressed through clothes and other forms of accessories.<sup>6</sup> Creativity triggers innovativeness which enable one to come out with new concepts and ideas which are relevant in the designing and implementation of fashion.<sup>7</sup> Traditional card weaving isn't

really suitable for 3-holed, 5-holed and 6-holed weaves. The uneven tension on the cards, whether they were threaded through adjacent or diagonal holes, tends to pull them out of position. In an extreme case of problem, the entire pack has to be reoriented. Further, conventional technique of card weaving is not handy to control the tension created in warp threads.

In view of the difficulty encountered in weaving large width articles and also controlling cards of multiple holes in creating textiles products with more structural variations, the present study was conducted on *design development of innovative card weaving module* and judging its efficacy for rural community.

**Methodology:** The present investigation was carried out in Udaipur city. It was based on exploring the possibility of creating complex structural variations through design development of innovative *Card Weaving module* using varied number of holes and involved experimental work.

**Sample selection:** The researcher selected five experts from the field of clothing and textiles to act as panel of experts for evaluation of structural variations in the developed products on selected parameters in terms of its suitability for various end uses.

**Development of tool:** A rating Performa was developed by the researcher for evaluation of the developed products using developed module for structural variations by panel of experts on various parameters. A five point rating scale was administered for the same, as follows: Excellent-5, Very good- 4, Good- 3, Fair -2 and Poor- 1.

**Experimental work:**

A module was designed by researcher to explore ways to expand structural arena of card weaving and explore ways to increase

the width of bands by special tension devices by cleverly combining card weaving with features of loom weaving.

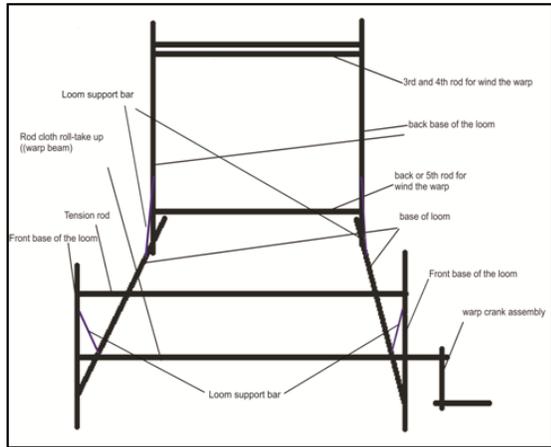
**Results and discussions:** The researcher selected five pattern drafts each from 2,3,4,5 and 6 holed cards followed by preparation and threading of cards on developed card weaving module to explore possible structural variations by changing movement of rotation.

**The developed module was designed with following characteristics**

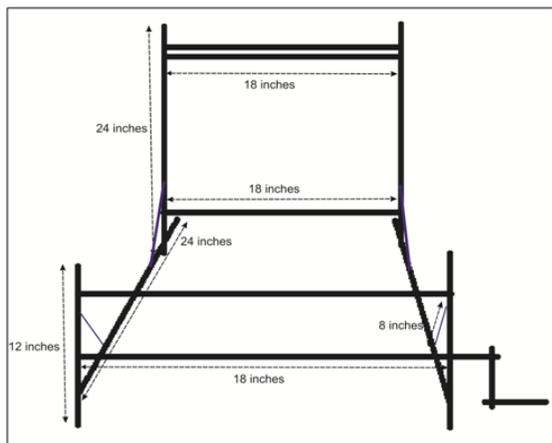
- ✓ Flexibility of incorporating more structural variations by easy handling of more number of cards.
- ✓ Eradication of the tedious time consuming process of conventional card weaving technique.
- ✓ Facilitate weaving of wider width of fabrics as compared to conventional card weaving technique.
- ✓ Sturdy iron base of the module for firm support.
- ✓ Flexibility of card rotation, i.e. some of the cards can turn in one direction and some in other direction.
- ✓ Module was easily portable; i.e. even during the process of weaving; the module can be move/shift to other place.
- ✓ Adequate arm's support to users for comfort during weaving, prevents falling of shuttle. And there was space for a pattern sheet for easy viewing.
- ✓ Easy handling of high tension warps due to heavy duty construction with iron rods. This overcomes the problems of conventional card weaving technique, in which warp was bind between a chair at one end and another end to a door, creating the problem to adjust tensions between both the ends.
- ✓ The design features of the module allows for plenty of working room, even with hundreds of cards. This was often a challenge with conventional technique.

**Module description:**

In the developed card weaving module, the tension was provided by tension rod. The tension can be increased by moving the rod upwards and vice versa. The developed module has various parts similar to conventional loom. The structural frame of the developed module was made using iron frame having flat/ circular shapes to support the design.



**Figure 1: Sketching of developed module and labeling of different parts.**



**Figure 2: Dimensions of different parts of developed module.**

The developed module was made with light weight iron rods for durable and sturdy structure, measuring 18 inches wide x 24 inches tall and weighs approximately 4 kg. The module was designed with the aim to

keep it portable, *convenient to use* yet being highly functional. The base of the module was made by flat iron angles measuring 1”x1”. The length of the bottom flat bars were kept 24” long to form the base of the loom. The upright back bases of loom (away from the weaver) were 24” high. The front upright base bars (closer to weaver) were 18” high to form the structure of the module. All the bars/pieces were assembled at required places using nuts and bolts, as per design of the module.



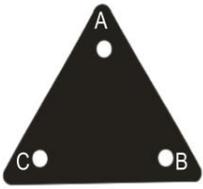
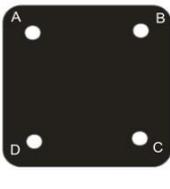
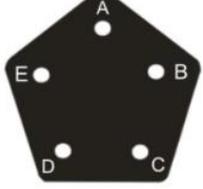
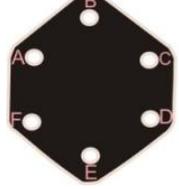
**Plate 1: Depicts the module in final shape.**

The developed card weaving module can accommodate any number of cards ranging from very few cards to (make narrow width) as many as hundred cards, depending on the required width of the fabric to be developed. The developed card weaving module can have warps approximately 6 feet long to suit various end purposes. It can be easily foldable for easy portability and can be dismantled also. It can weave a flat fabric up to 13 inches wide and 50 inches long.

**Card weaving on module:**

**Preparation of cards:**

The researcher prepared 2, 3, 4, 5 and 6 holed cards using discarded X-ray sheets as demonstrated below for developing the structural variations in pattern.

Multi Holed cards				
				
<b>Two Holed Cards</b>	<b>Three Holed Cards</b>	<b>Four Holed Cards</b>	<b>Five Holed Cards</b>	<b>Six Holed Cards</b>

**Threading of cards:**

The total number of warp yarns needed was ascertained by multiplying the number of cards to be used by the number of holes in each card. The length of the warp yarns was kept 12-15 inches times larger (for finishing the edges) than the ready length of the article. Cards were threaded either from front to back known as ‘S’ threaded or from back to front known as ‘Z’ threaded as designated in the draft plan. Each warp thread was settled down on the loom one by one. The simplest way was to prepare a continuous warp using four balls/cones of thread. The threading of the cards was carried out as per design in the pattern draft in different colours.



**Plate 2: Threading of card.**

**Warping on the card weaving module**

Take the threaded card and start from the tension rod, go around the warp winding bars at back side (horizontal rods) then down

on the back of the loom. Then forward and around the front rod (cloth roll take-up rod). Bring the thread to the starting point, i.e. front of the loom at the tension rod. To hold tension on the warp threads, for this every thread should be equally tightened on the loom. Repeat for each card for a pattern draft. Divide the cards into groups of twenty cards. More cards can be taken in a group if it can be handled comfortably while weaving.



**Plate 3: Warping on the card weaving module.**

**Card weaving on the module**

Properly threaded cards ride quite easily and freely on the warp. The shed was formed by turning the cards. The cards can be turned either forward or backward as either a pack or an even divided into several packs or individually manipulated making many weave structures possible. The weft was passed through the shed and then beaten using a scale. The patterns in the weaving

were controlled by two things. The first was the warping pattern, and second was the pattern of turning the cards. There were several ways to turn the cards; a balanced weaving was achieved, when threads were turned forwards and backward in the same number of times. Cards were turned in various positions, like F B, 1F 1B, 2F 2B, 3F 3B, 4F 4B, 5F 5B, 6F 6B, 7F 7B, 9F 9B etc. Interesting effects can be obtained by turning more than one turn before putting the weft through.

**Finishing of the article:**

After completion of article to the required length, fabric was cut off and a binding stitch was done either with hand (back

stitch) or by using stitching machine at both ends of fabric. Then final finishing can be given to the products with different types of fringes, knotting and seams.

**Judging efficacy of developed ‘card weaving module’:**

Different personal and utilitarian products developed by the researcher with the help of ‘developed Card Weaving Module’ were evaluated by panel of judges using a rating Proforma, developed for this purpose.

**Figure no. 3 to 6 represents the percentage distribution for preferences of the panel of judges for various parameters.**



**Plate 4: Process of simplified weaving on developed card weaving module.**

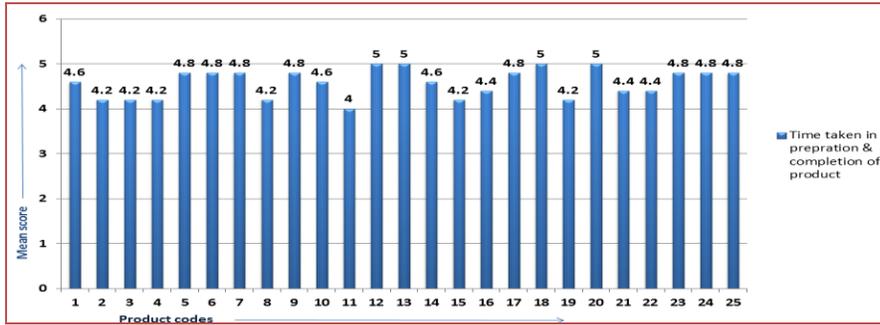


Figure 3: Preferences of the panel of judges for time taken in preparation & completion of product.

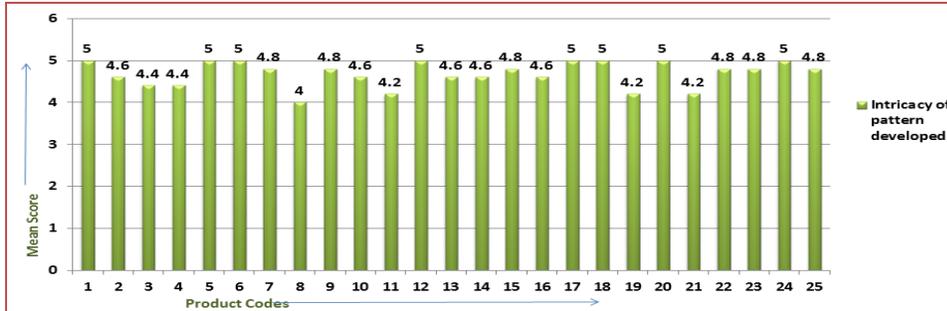


Figure 4: Preferences of the panel of judges for intricacy of pattern developed.

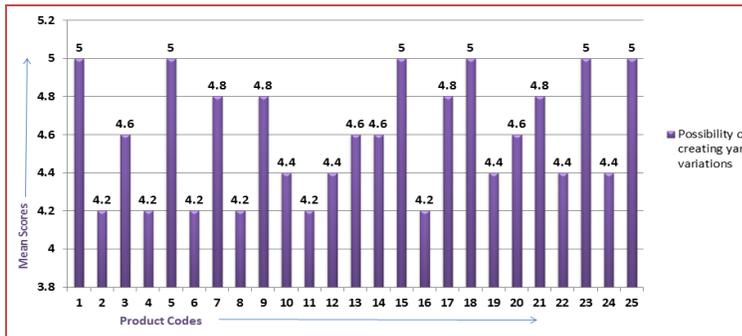


Figure 5: Preferences of the panel of judges for possibility of creating yarn variation.

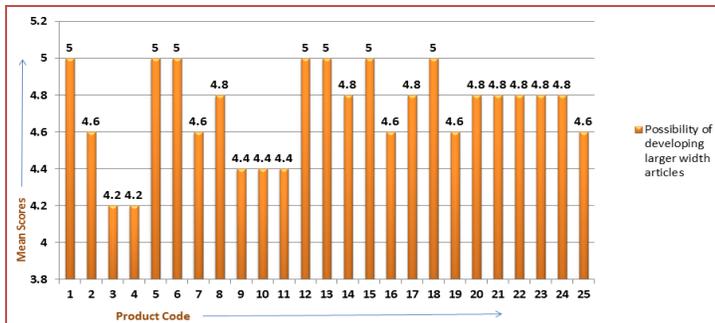


Figure 6: Preferences of the panel of judges for possibility of developing larger width articles.

### **A. Preferences of the panel of judges for time taken in preparation & completion of product-**

According to fig. 3, it was found that product code numbers 12, 13, 18 and 20 (stole, muffler, cap and bag respectively) were ranked as excellent for parameter *time taken in preparation & completion of product (in hours)* by all the respondents.

### **B. Preferences of the panel of judges for intricacy of pattern developed -**

It was evident from fig. 4, that all the respondents (100%) opined that the products with code numbers 1, 5, 6, 12, 17, 18, 20 and 24 (waist belt, slip-on, trimming for kurta, stole, calf cuffs, cap, bag and multipurpose strap respectively) were found excellent on parameter of *intricacy of pattern developed*.

### **C. Preferences of the panel of judges for possibility of creating yarn variation -**

In case of parameter, *possibility of creating yarn variations*, product codes 1, 5, 15, 18, 23 and 25 (waist belt, slip-on, poncho, cap, pooja mat and file folder respectively) were ranked excellent by all the respondents as in fig.5.

### **D. Preferences of the panel of judges for possibility of developing larger width articles -**

According to fig.6, in the parameter *possibility of developing larger width articles*, excellent ranking was depicted by product codes 1, 5, 6, 12, 13, 15 and 18 (waist belt, slip-on, trimming for kurta, stole, muffler, poncho and cap respectively).

The cost of products developed using developed module was compared with traditional method of card weaving in terms of time taken in completion of products and it was found that time consumed in developing products for various uses ranging from small one like belts, mobile pouches to bigger one like bags, stole etc reduced

greatly and it was apparently 2 to 4 times lesser as compared to traditional method which clearly depicts the improvements in time saving in preparation of products. According to results it was found that mean scores range for cost effectiveness of the products were between 4.6 to 5.0 i.e. “very good” to “excellent”.

The study by Kaur (2011) and Sunidhi (2004) revealed that it was possible to earn profit by making craft articles based on preferences of respondents.

### **Conclusion**

The present study explored the possibility of creating complex structural variations in textile products by using developed card weaving module. The tablets used in card weaving are typically shaped as regular polygons, with holes near each vertex and possibly at the center, as well. The number of holes in the tablets used is a limiting factor on the complexity of the pattern woven. Findings of the study revealed that there exists a wide arena of the possibility of structural variations in the weaving pattern by varying the number of holes and through manipulation of cards easily through developed card weaving module.

Interesting effects were created in textile products created using developed module by the researcher in much lesser time which were highly appreciated by the judges also. The developed module has can be very effective in empowering rural women by training them in its effective use.

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