

**Madhubani art- a design inspiration to develop motifs for
hand painting on skirts**

By

Gayathri. M

(15PTF001)

**A Thesis submitted to the
Avinashilingam Institute for Home Science and Higher Education for Women
Coimbatore-641 043**

In Partial Fulfillment of the Requirements for the
Degree of Master of Science
in
Textiles and Fashion Apparel

April, 2017

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Signature of the

Head of the Department


10/4/17

Signature of the guide

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1. INTRODUCTION

The term "Fashion" is frequently used as a synonym for glamour and style. Fashion doesn't limit itself to dressing but is an expression of the mood and taste of an individual. Fashion refers to change, which is inevitable. India which has always been a centre for the textile and garment trade and is also growing into a centre of innovation in garment and accessory design (Pundir, 2007). Fashion is a conception of what is currently appropriate (Sodhiya, 2009). Ever since eve covered herself with the biblical, functional fig leaf, women through the ages have covered themselves in ways that have made fashion history (Diamond and Diamond, 2007). Fashion is a language of signs, symbols and iconography that non-verbally communicate meanings about individuals and groups. Fashion in all its forms from a tattooed and pierced ravel, to the newest hairstyle, is the best form of iconography we have to express individual identity. It enables us to make ourselves understood with rapid comprehension by the onlooker (Davis, 2008).

Fashion design is an art of the application of design and aesthetics or natural beauty to clothing and accessories. Fashion design is influenced by cultural and social latitudes, and has varied over time and place. Fashion designers work in a number of ways in designing clothes and accessories. They attempt to satisfy consumer desire for aesthetically designed clothing and because of the time required to bring a garment onto the market, must at times anticipate changing consumer tastes (Nayak, 2013). Fashion designers attempt to design clothes which are functional as well as aesthetically pleasing. They must consider who is likely to wear a garment and the situations in which it will be worn. They have a wide range and combinations of materials to work with and a wide range of colours, patterns and styles to choose from (Tyagi, 2012). Clothes are a part of our life. They protect us, warm us and give us pleasure. They express our moods and personality. There are four main reasons for wearing clothes. Firstly, comes modesty, the need to hide one's body from the sight of others. Secondly, it protects against the cold or wet, or, in tropical lands, against heat. Thirdly, it is utility for instance the need to carry things. This has influenced the shape of clothing. Fourthly, comes the most important one of all is variety. The clothes must be practical, comfortable, light, yet warm as per weather requirements (Sumathi, 2002).

Historically clothing has served many purposes arising from diverse needs, fears and desires. Basically it supplies the need for physical protection and more importantly provides a means of individual identity and social status through personal adornment. The desire to decorate appears to be the most compelling motive for wearing clothes (Jimsey, 1976). A dress should not be simply considered as a garment made of good durable material and serviceable colour but instead as an expression of artistic qualities like the means of expressing oneself (Ryan and Philips, 1965)

There are two types of dress codes namely formal and casual. Under formal code comes semi-formal and informal codes. And in casual code comes the smart casuals, business casuals (Roy, 2011). Properly designed clothes are very important for adolescents. Fashionable clothes look beautiful. They keep on changing along with the times. They can be old styled, traditional, modern, rigid, practical, customary, experimental and trendy. Fashion is a state of mind hence it is important to dress according to the personality, body type and comfortable level (Gupta et al, 2005).

Traditional art is a part of the culture of a group of people, skills and knowledge of which are passed down through generations from master craftsmen to apprentices. Traditional artists work organically from within a community to which they belong. Community is defined as a group of people who share something in common such as ethnicity, region or occupation (www.traditionalartsindiana). Madhubani painting is one of the traditional arts. Madhubani paintings are also referred to as Mithila art, as it flourished in the Mithila region of Bihar. These paintings were initially drawn on the walls and were known as Bhatti Chitra. The paintings were mainly created by village women. The techniques and styles are passed from one generation to another (Kaur, 2010).

Adolescents are more concerned about the fashion and trend of a garment and they select clothes that enhance their good features and they are attracted by the styles, fabrics and pattern worn by others (Gogai, 1998). Skirt is a women's outer garment fastened around the waist and hanging down around the legs. Changing the silhouette of a skirt is one of the focal points for designers who wish to change the look and direction of fashion. A skirt whose basic shape hangs straight from the hip line to the hem is radically changed by increasing or decreasing the sweep of the hemline, moving the skirt away from or closer to the figure, or raising and lowering the waistline (Armstrong, 2004). Skirt is gaining an eminent place in the stores all over the world and anyone between the age of 6 -

60 years can wear it. It is hoped that this study would benefit adolescent girls belonging in the age group of 18 – 21 years and help them in selecting suitable designs and materials required.

In the present world, computers have grown to be foremost requirement of almost every conceivable profession, which requires creativity, accuracy and good implementation of time. The two most popular and influential software used in the world of fashion are Corel Draw and Adobe Photoshop (Luthur, 2008). CAD has become an especially important technology within the scope of computer aided technologies. It enables the designers to layout and develop work on screen, print it out and save it for future editing, saving time on their drawing (Neelima, 2009)

Now-a-days people give more importance to attractive appearance rather than protection or comfort through clothing. This is brought out by an art of dressmaking. Developing dresses gives expression to person's style, behaviour and attitude. (Indian Silk, 1980).

Surface embellishment is an art of decorating a ground fabric with print, paint, embroidery stitches, applique, mirror, bead and sequence which enriches it and adds to its beauty. Decoration on fabrics embraces a wealth of different historical and contemporary techniques. All over the world people continue to develop traditional and innovative methods to decorate garments or to create an art form that re-interprets the traditional skills.

Keeping these facts in mind, the investigator has made a study on "MADHUBANI ART – A DESIGN INSPIRATION TO DEVELOP MOTIFS FOR HAND PAINTING ON SKIRTS" with the following objectives.

- ❖ To select the inspired madhubani designs
- ❖ To hand paint the selected motifs on fabric
- ❖ To construct skirts for adolescent girls

2. REVIEW OF LITERATURE

The literature review comprises of the following heading

2.1 Fashion

2.2 Design

2.2.1 Types of Design

2.2.2 Elements of Design

2.2.3 Principles of Design

2.3 Colour Harmonies

2.4 Traditional Indian Paintings

2.4.1 Introduction of Traditional Indian Paintings

2.4.2 History of Traditional Indian Paintings

2.4.3 Types of Traditional Indian Paintings

2.5 Madhubani Painting

2.5.1 Origin of Mithila

2.5.2 Colours of Madhubani

2.5.3 Motifs

2.6 Surface Embellishment

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2.6.4 Embroidery

2.7 Skirt

2.7.1 History of Skirt

2.7.2 Types of Skirts Based on their Lengths

2.8 Need for Standardizing Body Measurement

2.8.1 Standard Measurement

2.9 Computer Aided Designing

2.1 FASHION

Fashion is a term, which is referred to as a state of mind. The word comes from Latin word, which means to make (Davis, 2008). Fashion is all about style. Fashion is a term used commonly to describe a style of clothing worn by most people of a country. A fashion remains popular for a few months or years before being replaced by yet another fashion. Fashion is a popular trend of clothing that may differ from time period to time period or across areas of modern society (Tyagi, 2012). Fashion is the area of activity that involves styles of clothing and appearance (www. Collinsdictionaries.com).

2.2 DESIGN

A design is a composition of silhouette, colour, texture and details which create specific versions or variations of a style. Design is an organization when anything is designed, it is put together with some intent or goal in mind. Everything that is not entirely accidental is to some extent designed (Prakash, 2004). Design is defined as a particular purpose held in view by an individual or group, it is the arrangement of elements or details in the product or work of art and a decorative pattern (Tartara, 2003).

2.2.1 Types of Design

The design can be divided into structural design and decorative design (Neelima, 2009).

Structural Design

Structural design is one of the most important means of identification which represents the fundamental character of the article under consideration. This fundamental quality is potent in conditioning whether the article is considered good or poor in design. Structural design also includes colour, texture of the material from which the article has been formed. As Goldstein (1993) says, structural design is defined as the design made by the size, form, colour and texture of an object. In the fabric, structural design is formed by stitching together pieces like collar, cuff, yoke and pleats (Gupta, 2009).

Decorative Design

Decorative design is the surface enrichment of structural design. Any lines, colours or materials that have been applied to a structural design for the objective of adding a richer quality to it, constitutes its decorative design. Decorative designs add luxury of design (Neelima, 2009).

2.2.2 ELEMENTS OF DESIGN

In creating a design one of the components which interact is the art elements. The elements of design are flexible and should be interpreted within the context of current fashion. The elements are therefore the raw materials that must be combined successfully. The elements of design are Line, Form, Shape, Texture, Colour.

Line

A line is a series of connect points. Line provides the visual dimensions of length and width. When lines combine, space is enclosed by which forms and shapes are defined. Lines offered a path of vision for the eyes when is wearing an outfit. The arrangement of lines in clothing design can cause to appear heavier or thinner than what actually is (Sumathi, 2002).

Vertical lines stand upright and suggest stability. As the vertical lines tend to lead the eye in a vertical direction, the eye measures the length of that place or area. This feature adds apparent height and length to the body silhouette and makes it look narrower or thinner. Vertical lines that run up and down seem to show dignity, formality and strength. Horizontal lines, which run parallel to the ground, appear to be at rest. They lead the eyes from one side to the other, adding apparent width and shortening the body silhouette. Diagonal lines are dynamic and action- oriented, they portray dimensions and directions (Prakash (2004).

Diagonal or slanting, lines signal action and excitement. Zigzag lines, which are made from combined diagonal lines, can create a feeling of confusion or suggest action. Curved lines express movement in a graceful, flowing way (Mittler Ragan, 1992).

Form

Form is an object having three dimensions like length, width and depth. Form can be measured, from top to bottom, side to side and from back to front. Form is also defined by light and dark. It can be defined by the presence of shadows on surfaces or face of object. There are two types of form, geometric and natural. Form may be created by the combining of two or more shapes. It may be enhanced by tone, texture and colour. The design might have circular or triangular form or might be composed of number of curved lines (Griner, 2000).

Shape

A shape is defined as an area that stands out from the space next to or around it due to a defined or implied boundary, or because of differences of value, colour or texture. It is formed when line encloses an area. These line enclosures create an illusionary focus termed as shapes says Sodhia (2005). Shapes can vary endlessly and can suggest physical form and direct eye movement based on the directional movement of lines. Shapes define figure, create ground relationships and relate forms and figures identify Pundir (2007).

Texture

Texture defined as the surface characteristics of a material that can be experienced through the sense of touch (Davis, 2008). Textures are of two types: tactile and visual. Tactile textures can be felt with a touch and is found in natural material as well as solid materials like stone and silk. Visual textures are seen due to surface or ornamentation like printing, embroidery and smocking (Sodhia, 2008).

Colour

Colour is more potent than line or texture in giving interest to a design. It tends to attract and hold care to great extent. Colour is the most important part of designing (Tate, 2004). Colour is the fundamental consideration in design process. It is the property of an object that results from the reflection, transmission or emission of light waves which cause a visual perception in the eye depending upon the specific wavelength involved. Each colour has different wavelengths or frequencies (Mekelvey and Munslow, 2003).

2.2.3 PRINCIPLES OF DESIGN

The principles of design are useful in creating different forms of expression in an artistic manner, which are pleasing and attractive to the eye. The principles that constitute a good design can be analyzed by proportion, balance, rhythm, emphasis and harmony.

Proportion

The relationship in a design of one part to the other or of all the parts to the whole is termed as proportion. Proportion is the principle of design which is achieved when the various sizes are successfully grouped in any arrangement so that they are in a scale. Proportion is the feeling of unity created when all parts (sizes, amounts or number) relate well with each other (Neelima, 2009).

Balance

Balance is the distribution of the visual weights of objects, colours, texture and space. If the design was a scale, these elements should be balanced to make a design feel stable. In symmetrical balance, the elements used on one side of the design are similar to those on the other side; in asymmetrical balance, the sides are different but still look balanced. In radial balance, the elements are arranged around a central point and may be similar (Kerr and Keats, 2009). Balance is the concept of visual equilibrium, and relates our physical sense of balance. It is a reconciliation of opposing forces in a composition that results in visual stability (Twigg, 2013).

Rhythm

Rhythm is created when one or more elements of design are used repeatedly to create a feeling of organized movement. Rhythm may be defined as the form of movement. Movement is the path the viewer's eye takes through the work of art, often to focal areas (Udale and Sorger, 2006). Such movement can be directed along lines, edges, shape and colour within the work of art. Rhythm may also be developed when there is orderly arrangement of details according to size. This is rhythm by means of gradation (Tate, 2007). The use of rhythm as a design tool is important in achieving pleasing effects. Rhythm in design results from lines and masses that form repetitions; these repetitions can be either uniform or of decreasing or increasing size. Rhythmic patterns can be generated by superimposing scales (Sumathi, 2005).

Emphasis

Emphasis is the part of the design that catches the viewer's attention and becomes a focal point. Emphasis is often the result of a strong use of rhythm, proportion or balance in the apparel form (Stecher, 2006). Emphasis is the center of interest, which draws and holds attention more than any other part. Usually the artist will make one area stand out by contrasting it with other areas. The area could be different in size, colour, texture and shape. In design, emphasis is whatever stands out the most gets the attention (Lauer, 2006). Every picture has a central point that highlight the main theme of the picture to make it more lively (Narang, 2006).

Harmony

Harmony is otherwise called unity. If the principle of proportion, balance, rhythm and emphasis are creatively, the resultant design is said to have the harmony. A harmonious design produces a realization of unity without monotony. Complete harmony means a unified oneness. Unity means that all elements of the design work together to produce a successful visual effect (Kellor, 2011).

2.3 COLOUR HARMONIES

Naturally, there are always expectations; talented, creative people can take delight in sketching the boundaries of what works in colour schemes. Colour interactions are both optical and aesthetic phenomena. A process for visualizing colour combinations allows colour usage to shift with changing media (Stone, 2008).

Achromatic

Meaning without colour an achromatic scheme consists of black and white and the vast range of grays that can be mixed from them. Variations are possible. Warm and cool achromatic colours are made by adding a tint of red, yellow or blue (Sawcahata, 1994).

Monochromatic

Monochromatic colour scheme uses variations of single colour. This combination may create a sense of harmony (Frankhea, 1988). It looks clean and elegant, especially in blues and greens choose one colour and then paler tints and darker shades of the same colour. This

colour scheme always looks balanced and visually appealing but is rarely vibrant (Wood, 2008).

Analogous

Analogous colour schemes are colours that are next to each other on the colour wheel. They usually match well and create sense and comfortable designs. Analogous colour schemes are often found in nature and are harmonious and pleasing to the eye. (www.tigercolour.com). This scheme is one of the most beautiful in an art work. This colour scheme is closely related colour families that are placed side by side of the colour wheel. Any three adjacent colours can be used. (Wolform, 2010).

Complementary colour scheme

A complementary colour scheme is made of two colours that are opposite to each other on the colour wheel. The complement of a primary colour is the mixture of the other two primary colours. The complement of red is green. This scheme offers the strongest contrast of any colour scheme (Dufesne, 2010). Complementary colours are beautiful when a variety of tints and shades are used (Targhman, 2007).

Split complementary colour scheme

Split complimentary scheme is a variation of the complementary colour scheme. Split complimentary schemes are used as a particular colour and their two colours adjacent to its complement. This provides high contrast without the strong tension of complementary scheme (Moses, 2007).

Triad colour scheme

The word triad derived from a triadic colour wheel, the three colours are equidistant, equally spaced from each other. The most commence easily identified triadic schemes use the primary colours of red, yellow and blue or secondary colours of orange, purple and green. While using, this scheme should be handled very carefully, because unrelated colour together and its in difficult to use. (Haggard, 2012).

Tetrads colour scheme

The tetrad colour scheme is the richest of all the schemes because it uses four colours arranged into two complementary colour pairs. This scheme is hard to harmonize and requires a colour to be dominant or subdue the colours. It is one of the most vibrant colour schemes using more variety of colour but as a result can be difficult to balance harmoniously (Langdon, 2010).

2.4 TRADITIONAL INDIAN PAINTINGS

2.4.1 Introduction of Traditional Indian Paintings

The tradition of painting has been carried on in the Indian subcontinent since the ancient times. Standing as a testimony to this fact are the exquisite murals of Ajanta and Ellora, Buddhist palm leaf manuscripts, Mughal and Kangra schools of miniature Indian paintings, etc. In fact, records have been found that indicate the usage of paintings for decorating the doorways, guest rooms, etc. Some traditional Indian paintings, like those of Ajanta, Bagh and Sittanvasal, depict a love for nature and its forces.

With time, Indian classical paintings evolved to become a sort of blend of the various traditions influencing them. Even the folk painting of India has become quite popular amongst art lovers, both at the national as well as the international level. Most of the folk paintings reflect a heavy influence of the local customs and traditions (www.wikipedia.com).

2.4.2 History Traditional Indian Paintings

Indian painting has a very long tradition and history in Indian art. The earliest Indian paintings were the rock paintings of pre-historic times, the petroglyphs as found in places like Bhimbetka rock shelters, some of the Stone Age rock paintings found among the Bhimbetka rock shelters are approximately 30,000 years old. India's Buddhist literature is replete with examples of texts which describe palaces of the army and the aristocratic class embellished with paintings, but the paintings of the Ajanta Caves are the most significant of the few survivals. Smaller scale painting in manuscripts was probably also practised in this period, though the earliest survivals are from the medieval period. Mughal painting represented a fusion of the Persian miniature with older Indian traditions, and from the 17th century its style was diffused across Indian princely courts of all religions, each developing a local style. Indian paintings provide an aesthetic continuum that extends from the early civilisation to the

present day. From being essentially religious in purpose in the beginning, Indian painting has evolved over the years to become a fusion of various cultures and traditions (www.indianzone.com).

2.4.3 Types of Traditional Indian Paintings

Cave Painting

Cave paintings of India date back to the prehistoric times. The finest examples of these paintings comprise of the murals of Ajanta, Ellora, Bagh, Sittanavasal, etc, which reflect an emphasis on naturalism. Ancient cave paintings of India serve as a window to our ancestors, who used to inhabit these caves (www.livescience.com).

Madhubani Painting

Madhubani painting originated in a small village, known as Maithili, of the Bihar state of India. Initially, the womenfolk of the village drew the paintings on the walls of their home, as an illustration of their thoughts, hopes and dreams. With time, the paintings started becoming a part of festivities and special events, like marriage.

Miniature Painting

Miniatures paintings are beautiful handmade paintings, which are quite colorful but small in size. The highlight of these paintings is the intricate and delicate brushwork, which lends them a unique identity (www.britannica.com).

Mughal Painting

Mughal painting reflects an exclusive combination of Indian, Persian and Islamic styles. As the name suggests, these paintings evolved as well as developed during the rule of Mughal Emperors in India, between 16th century and 19th century.

Mysore Painting

Mysore Painting is a form of classical South Indian painting, which evolved in the Mysore city of Karnataka. During that time, Mysore was under the reign of the Wodeyars and it was under their patronage that this school of painting reached its zenith (www.nriol.com).

Tanjore Painting

Tanjore Painting is one of the most popular forms of classical South Indian painting. It is the native art form of Thanjavur (also known as Tanjore) city of Tamil Nadu. The dense composition, surface richness and vibrant colors of Indian Thanjavur Paintings distinguish them from the other types of paintings (www.tanjorecollections.com).

Kalamkari painting

Kalamkari is an exquisite ancient craft of painted fabrics. It deserves its name from *kalam* meaning pen, and *kari* meaning work, literally pen-work. It is a form of hand painting with vegetable dyes. It is said that kalamkari art evolved around 3000 years ago in Andhra Pradesh. The earliest samples used *Ramayana and Mahabharata* as inspiration. New themes have been introduced over years and this has given kalamkari a new lease of life (Kaur, 2010).

2.5 MADHUBANI PAINTING

Madhubani literally means “*forest of honey*”. This art form which dates back to the 7th century is from the Mithila area – specifically Madhubani village of Bihar; hence also called Mithila paintings. Madhubani District is one of the thirty-eight districts of Bihar State, India. Bound on the north by a hill region of Nepal and extending to the border of its parent district Darbhanga in the south, Sitamarhi in the west and Supaul in the east. Madhubani has five sub-divisions namely Madhubani, Jaynagar, Benipatti, Jhanjharpur and Phul Paraas and 20 community development blocks (Jaitly, 2012).

2.5.1 Origin of Mithila

Madhubani paintings is believed to be originated from the town of Madhubani of Mithila in the North Indian state of Bihar. The exact reason or time of the origination of Madhubani art is unknown. However, the legend has it that it came into vogue during the time of Ramayana, when Janak ordered the artists in his own kingdom to make beautiful paintings for the wedding of his daughter Sita, to Lord Rama. This art, with a tradition going back to the centuries, is today an exclusive monopoly of women artists. They paint figures from nature and myth on household and village walls to mark the seasonal festivals of the religious year, for special events of the life-cycle, and when marriages are being arranged they prepare intricately designed wedding proposal. Initially, the women in

Madhubani started making the paintings on the walls of their huts. With time, the artists began creating Madhubani art on paper, cloth and canvas also (Asher, 2003).

2.5.2 Colours of Madhubani

The artisan of Madhubani paintings are used colours directly from nature. Lamp soot served as a source of black, White from powdered rice, green was made from the leaves of the apple tree and Tilcoat, blue from the seeds of *Sikkot* and *indigo*, yellow was drawn from the parts of *singar* flower or Jasmine flower, bark of peepal was to be boiled to make a part of saffron colour, red was made from *kusum* flower and red sandal wood. To make the painting last long as well as to take brightness they mixed gum with colour. The colours, designs and styles keep on adapting to the changing tastes and fashions as man's aesthetic sense motivates him to introduce grace and elegance into the monotony and drabness which leads gradually to new decorative designs through fine form, colour and style (Yadav, 2006).

2.5.3 Motifs

As the skill is passed from one generation to the other, traditional designs and patterns are still used. The motifs are generally inspired from nature and mythology. Hindu deities and other related motifs are painted, such as Krishna, Shiva, Rama, Ganesha, Durga, Lakhmi, Saraswati, Sun, Moon and Tulsi plant. The feet of goddess Lakshmi are common motif depicting that she walked through the house. These paintings are an assembly of symbolic images of the Lotus, Fishes, Birds and Snakes in union and represent fertility and proliferation of life (Kaur, 2010).

2.6 Surface embellishment

Surface designing refers to superficial embellishment on the fabric or structural and applied design on any substrate. There are innumerable varieties of decorations that enrich the fabric surface but techniques limited to substrate sources. The yardage of cloth, sometimes chosen for embellishing depends on the specific end use. The most predominating techniques that enhance the consumer acceptance by beautifying the textile materials are painting, printing, dyeing and embroidery.

2.6.1 Hand painting

Hand painting involves use of dye or pigment with media applied to textiles are was fast when used on suitable fabric. Some paints though resemble dyes are not wash fast. Different types of paint have different appearance. Some form hard shiny surface, some plastic based paints form raised surfaces, emulsions used like pigments or designer's gouache are used for fabric painting (Shailaja, 2006).

2.6.2 Patch and appliqué

A patch work or pieced work is a form of needle work that involves sewing together pieces of fabric into a larger design. Patch work is the term used when a fabric is made by joining pieces or patches of fabrics. Appliqué work refers to pieces of fabric cut in geometric or novelty shapes to be applied on another fabric with proper edge finishing. It gives decorative look to the garment. The appliqué work can be made in 3 dimensional with the use of padding under the appliqué patches. Appliqué work done on ladies and kids wear (Calto, 1992).

2.6.3 Laces

Laces are also openwork fabric made by looping, knotting, braiding, twisting or stitching threads in an open and decorative work pattern. Laces are made with types of fabrics, such as cotton, silk and rayon with linen being restricted as expensive laces.

2.6.4 Embroidery

Embroidery can be applied before and after the construction of a garment and concentrated in specific areas or as part of an overall design. It can be used as an embellishment on the surface of the cloth to enhance the look of the fabric or it can be used in a way that makes it integral to the function of the garment, rather than supply as a decorative addition. Contemporary embroidery is based on traditional techniques (Udale, 2008).

2.7 SKIRT

Skirt is something that covers the lower part of the body especially for girls, women or ladies. Skirts come in a variety of shapes and styles and they are essential items in women's wardrobes. Skirts are more elegant and easy to wear and besides they can be

worn in all occasions. It is easier to design skirt than any other garment. In today's fashion world we find a variety of types of skirt which can be categorized based on size, fabric, and design. Changing the silhouette of a skirt is one of the focal points for designers who wish to change the look and direction of fashion. (Armstrong, 2004).

2.7.1 History

A straw-woven skirt dating to 3900 BC was discovered in Armenia at the Areni-1 cave complex. Skirts have been worn by men and women from many cultures, such as the lungi, lehnga, kanga and sarong worn in South Asia and Southeast Asia, and the kilt worn in Scotland and Ireland. The earliest known culture to have females wear clothing resembling miniskirts were the Duan Qun Miao, which literally meant "short skirt Miao" in Chinese. This was in reference to the short miniskirts "that barely cover the buttocks" worn by women of the tribe, and which were "probably shocking" to observers in medieval and early modern times.

In the Middle Ages, some upper-class women wore skirts over three metres in diameter at the bottom. At the other extreme, the miniskirts of the 1960s were minimal garments that may have barely covered the underwear when seated. Costume historians typically use the word "petticoat" to describe skirt-like garments of the 18th century or earlier. During the 19th century, the cut of women's dresses in western culture varied more widely than in any other century. Waistlines started just below the bust and gradually sank to the natural waist. Since the 1970s and the rise of pants/trousers for women as an option for all but the most formal of occasions, no one skirt length has dominated fashion for long, with short and ankle-length styles often appearing side-by-side in fashion magazines and catalogs. (www.wikipedia.com).

2.7.2 Types of skirts based on their lengths

Normal Skirt

It is a normal skirt which is 2-3" below the knee size.

Micro Mini Skirt

These skirts have length which extends 10" from the waist above the mid-thigh.

Mini Skirt

The skirt whose length ends at mid-thigh level, are called mini skirt. These are very short and are usually long enough to reach between the crotch and the knees. They are casual or semi-dressy. In dressy or formal settings, they can be inappropriate.

Ballerina Skirt

The skirt which ends at mid-calf level is called ballerina skirt.

Maxi Skirt

Maxi skirts are those skirts whose length extends till the ankle or floor. These lengths vary a little based on vary to fashion and customers taste.

Broomstick Skirts

Broomstick skirts are either knee-length or ankle length and they have a wrinkled appearance. They are characterized by the three, or more, horizontal seams that wrap around the skirt in layers. They are either casual or semi-casual but cannot be dressy.

2.7.3 Types of Skirts Based On Design

Based on invariable designs the skirts can be classified into the following types.

Basic Skirt

The basic skirt will have the darts of equal lengths in the form of fullness at the waist line in the front and back. The pattern obtained can be used as the base for any other skirt with a hemline sweep that is equal on the front and back (Bray, 1978)

Pleated Skirt

A pleat is a fold in the fabric that releases fullness. These types of have lots of pleats of similar size around the waistline. It helps in giving an extra fullness to the skirt. Pleated skirts have vertical pleats running up and down the skirt all the way around. When there is movement, the skirt appears to open up. Pleats can be of various types and therefore have specific names for specific pleat based on their design for eg. box pleated skirt, inverted pleat skirt ,sunburst pleated skirt. Knife pleated skirts and, accordion

pleated skirt. These either reach to the knee or above the knee, and they require ironing. Pleated skirts are casual or semi-dressy (www.larapedia.com).

Circular Skirt

As the name suggest, this skirt looks like a circle when open fully therefore a fabric having maximum width is required for these kinds of skirt. The fabric is cut in a circle, like a donut. Then the elastic is sewn on top to create a waistband. The circle hangs right at the waist and allows the fabric to drape beautifully around you. These skirts do not need any side seam (Cooklin, 1999).

A Line Skirt

A line skirts represent the shape of the capital letter “A” hence the name i.e. An A line skirt is a skirt that is fitted at the hips and gradually widens towards the hem, giving the impression of the shape of a capital letter A. The waistline measurement remains the same as in plain skirt but fullness is added to hem so that its circumference increases. If more fullness is added at the waistline then it becomes a flared skirt. It is also one of the easiest garments for a beginner to make. It has only three pattern pieces a front, a back, and a waistband (www.craftsy.com).

Gored Skirt

A gore is a triangular piece of fabric. A gored skirt is one with gores which are narrow at the waistline and wider at the hemline. It can have any number of gores which can be equally or unequally spaced as ‘desired’ by the wearer. The gore can be of various types such as angled, flared, and pleated or may be straight from the hip level. There are two basic types of gored skirts are 6-gore and 4-gore skirt. These kind of skirts are preferred for bulky fabrics where in on finds difficult to gather the fabric at waist (www.esty.com).

Gathered Skirt

Gathered skirts are as the name suggests skirts that have gathers at the waistline. Usually thin fabrics are used for making these types of skirts as they can be gathered easily and there is no difficulty in stitching at the waistline where as Bulky fabrics can have limited fullness as there will be difficulty in stitching it to the waistline (Jaitly, 2012).

Layered Skirt /Tiered Skirt

Also called as tiered skirt layered skirts are skirts which have layers of fabric attached to the each other at the hemline. The length and width of each layer may be same or may vary. Each gives a different look. The fabric used may or may not be the same. Frills can also be attached (Chattopadhyay, 1985).

2.8 Need for Standardizing Body Measurement

Garment cutting is based on measurement (Mullick, 2004). It is important for a dress maker to know how to take accurate measurements (Zarapkar, 1985). The proper fitting of a good clothing depends on correct measurements. Taking measurements is technical and necessary in pattern making (Kumar, 1962).

The measurements needed will depend on the type and style of garment we are making and the age of the intended user (Mathews, 1985). Measurements are essential to the fitting process, but valuable information can also be gained simply from studying the body from all angles (Betzina, 2002).

2.8.1 Standard Measurement

Standard measurements are given set of measurements that comply with a commercial sizing. These measurements are a result of extensive anthropometric studies carried out on different age groups. Heights and girths (Sabeja, 2006). Anthropometry has been an integral part of anthropological research since the 19th century when the need first cross for a scientific method of describing living and extinct populations (Cooklin, 1991).

2.9 COMPUTER AIDED DESIGNING

CAD, or computer aided design and drafting (CADD), is the use of computer technology for design documentation. CAD software replaces, manual drafting with an automated process (www.autodesk.com). Computer graphics can also show the repeat of a fabric pattern, simulate fabric drape on the figures and help designers experiment with colours and fabric changes quickly (Stephens, 2002). Computer can be programmed to generate a variety of different colours and colour combinations for a particular design. Rendering and 3D modeling can provide presentation of fabric designs generating on CAD system in room settings and can be mapped onto a 3D model complete with realistic folds and lighting conditions on models (Jothi and Grover, 2009).

Corel draw is an enormously powerful graphic package. It creates and handles images as mathematically defined vectors. Corel draw is a vector graphics editor developed and marketed by corel corporation of Ottawa, Canada. It is also the name of corel's Graphics suite, which bundles Corel Draw with bitmap image editor, corel photo paint as well as other graphics related programs. Corel draw is designed to edit two-dimensional images such as logos and posters (en.m.wikipedia.org).

3. EXPERIMENTAL PROCEDURE

The experimental procedure of the study was carried out as explained below.

- 3.1 Standardization of Body Measurement
 - 3.1.1 Sample Selection
 - 3.1.2 Body Measurement for Skirt
 - 3.1.3 Standardizing the Body Measurements
- 3.2 Nomenclature
- 3.3 Selection of Motifs
- 3.4 Design Development Through Manual Sketching for Skirt
 - 3.4.1 Preparation of Manual Sketches
 - 3.4.2 Evaluation and selection of manual Sketches
 - 3.4.3 Preparation of Manual Colour Sketches
 - 3.4.4 Evaluation and Selection of Manually Coloured sketches
- 3.5 COMPUTER AIDED DESIGNING
 - 3.5.1 CAD Application
 - 3.5.2 Evaluation and Selection of CAD Designs
- 3.6 Hand Painting on Fabric
- 3.7 Construction of Skirts
 - 3.7.1 Selection and Sourcing of the Material
 - 3.7.2 Drafting
 - 3.7.3. Alteration and Transfer of Pattern
 - 3.7.4 Construction of Skirt
- 3.8 Evaluation of the Constructed Garments
 - 3.8.1 Visual Inspection
 - 3.8.2 Feedback through Self Assessment
- 3.9 Cost Estimation

3.1 STANDARDIZATION OF BODY MEASUREMENT

The body measurements were standardized as explained below.

3.1.1 Sample Selection

Sampling, is a process of selecting a few (a sample) from a larger group to become the basis for estimating or predicting the prevalence of an unknown piece of information, situation or outcome regarding the bigger group (Kumar, 2005). A sample is a subset of population units (Gupta et al., 2002). A sample is a portion of the total population that is considered for study and analysis (Chandran, 2002). Simple Random sampling is the most simple procedure of drawing a sample from a given universe. In this sampling each unit has an equal chance of being selected and is called an equal probability sampling. (Chaudhary, 2009). The investigator planned to select random method of sampling to gather information for the study as careful selection of sample will give good results. The samples selected were a randomly selected group of adolescent girls.

3.1.2 Body Measurement for skirt

Measurements are essential to the fitting process (Betzina, 2003). It is very important for a dress – maker to know the method of taking accurate measurements (Zarapkar, 2011). Good fit is a combination of two components namely good and comfortable. The first and the most important ingredient for proper fit is measurements (Sodhiya, 2004). The measurements are taken comfortably without pulling the tape too tightly or too loosely but keeping it firmly by placing two fingers in between the tape and the body. In order to construct garments that will fit well body measurements were taken for 25 adolescent girls. Various body measurements taken for the construction of skirts are given below.

- **Waist Circumference** was taken around the waist line with the tape close, but not tight and parallel to the floor.
- **Hip Circumference** was taken around the widest part of the hip – keeping the tape parallel to the floor.
- **Skirt Length** was taken down from the centre back from waist to desired length of the skirt

The measurement obtained for the 25 selected samples are given in Appendix – I.

3.1.3 Standardizing the Body Measurements

Standardization in a broader sense as a means to find a mean result which would suit a particular purpose (The Indian Standards Institution, 1983). The Standard measurements are a given set of measurements that comply with a commercial sizing (Saluja, 2006). Standard measurements are the average measurements of a large number of figures (Mullick, 2002). Mode is often said to be the value which occurs most often in the data, that is with the highest frequency (Gupta, 2002). Mode is the value which has the greatest frequency density (Navanitham, 2014).

The value which has the greatest frequency is mode. Individual observations are the value or the values which occurs more times are identified. The set which has only one mode is said to be unimodal. Sets with two modes are said to be bimodal. Set which have more than two modes are said to be multimodal (Navanitham, 2014). The body measurements were standardized. The calculation procedure used for standardizing the body measurements are given in Appendix – II.

3.2 Nomenclature

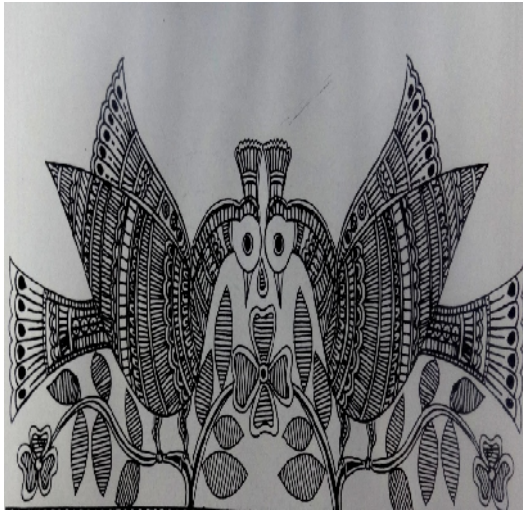
The details of nomenclature used in the chapters 3 and 4 are presented in Table – I

TABLE I
NOMENCLATURE

S.No.	Particulars	Nomenclature
1.	Motifs (Numbers assigned from M ₁ – M ₁₅)	M
2.	Manual Sketches (Numbers assigned from MS ₁ – MS ₂₅)	MS
3.	Manual Coloured Sketches (Numbers assigned from MCS ₁ – MCS ₁₀)	MCS
4.	Computer Aided Design (Numbers assigned from CAD ₁ – CAD ₄)	CAD
5.	Constructed garment (Numbers assigned from G ₁ – G ₄)	G

3.3 SELECTION OF MOTIFS

The motifs from Madhubani art which were inspiring were selected for the study. The common motifs like birds, fish, sun and borders were developed into designs by arranging in proper fashion. The selected motifs are presented in Plates- I(a), (b), (c).



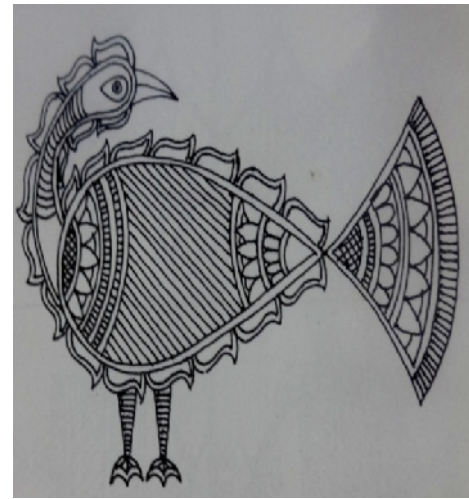
M₁



M₂



M₃



M₄



M₅

PLATE-I (a)
MOTIFS (M)



M₆



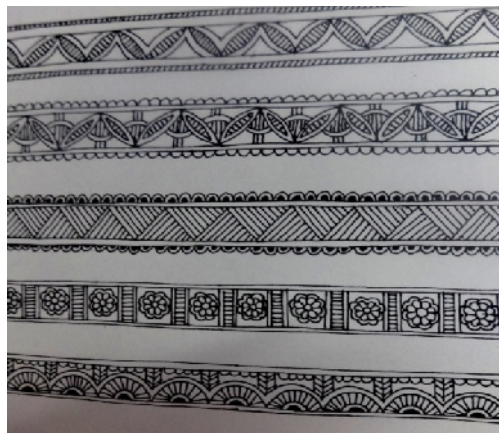
M₇



M₈

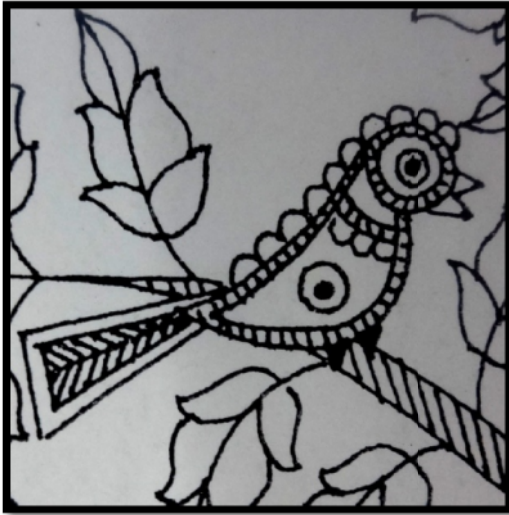


M₉



M₁₀

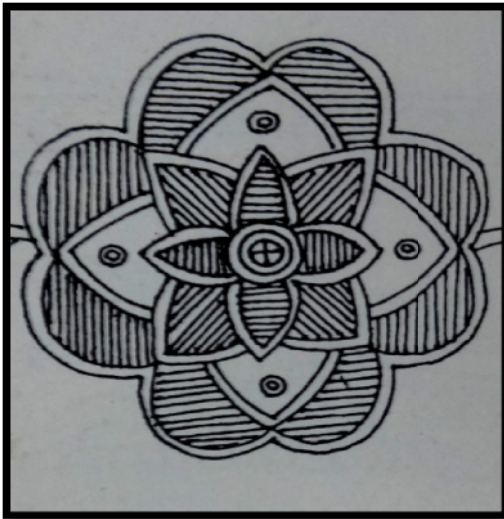
**PLATE-I (b)
MOTIFS (M)**



M₁₁



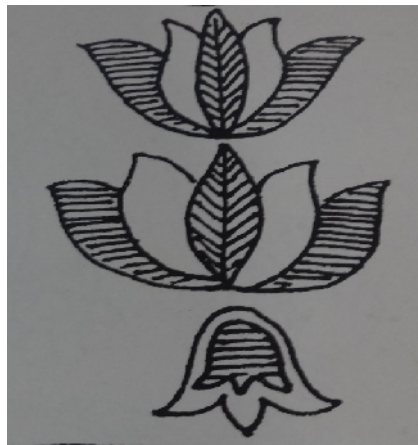
M₁₂



M₁₃



M₁₄



M₁₅

PLATE-I (c)
MOTIFS (M)

3.4 DESIGN DEVELOPMENT THROUGH MANUAL SKETCHING FOR SKIRT

The selected Madhubani designs were developed suitable for the skirts through manual sketching. Fashion illustration is the communication of Fashion that originates with illustration, drawing and painting. Fashion illustration has been around for nearly five hundred years. Ever since clothes have been in existence, and there has been a need to translate an idea or image into a Fashion illustration (Blackman, 2007). So these developed designs were applied on skirts through sketching.

3.4.1 Preparation of Manual Sketching

About twenty five manual sketches were prepared. (Plates – II (a) (b) (c) (d) (e)).

- **MS₁** – The design MS₁ comprises of madhubani design with a peacock on either side of a flower on a semicircular skirt. Continuous curved lines are formed on either side of the flower.
- **MS₂** – On a semicircular skirt twin peacock motif facing opposite sides was drawn. Two motifs were at one level and the middle one was slightly at a lower level. The Silhouette of circular skirt was used for this design.
- **MS₃** – Madhubani design MS₃ comprises of a big bird motif with fish on its body was designed. The bent bird was enriched with the traditional Madhubani pattern. This decoration was done on a particular portion of the skirt.
- **MS₄** – On a semi circular skirt, a bird motif was drawn at the centre. The bird has a bent appearance with the beak facing the tail.
- **MS₅** – On the silhouette of semi circular skirt a bird motif with Madhubani style was designed facing downwards.
- **MS₆**- The design MS₆ was done on semicircular skirt. The elements of design namely line and shape which are used at the borders of Madhubani pattern were applied in this design running from waistline till the knee level of the skirt. It gives an illusion that there is a separate piece from the waistline till the knee. The design comprises of diagonal lines ordered with semicircular pattern. A petal motif was drawn on either side on the front portion of the skirt. This was enriched with a border.
- **MS₇**- This design consists of horizontal lines running in segments at the waistline of the skirt Each segment consists of vertical lines and enriched with semicircular,

Triangular shapes and diagonal effects. The vertical lines ended with dot to enrich the design.

- **MS₈**- On a semi circular skirt, a leaf like motif was drawn on either side of the front portion. Each petal design was divided into two segments which comprised of right angled triangle and the whole design was filled with diagonal lines.
- **MS₉**- The design MS₉ was done on a semicircular skirt. A group of leaf motif was filled in a triangular shape. The leaf motif was filled with lines. This brought a principle of progression in design.
- **MS₁₀**- On a semicircular skirt, two bird motifs facing each other were drawn which were placed at the centre of the skirt. They were enriched with feathers. Horizontal lines were drawn on the body of the birds.
- **MS₁₁**- On semi circular skirt, at waistline and border line of the skirt, horizontal zigzag lines were used. One segment was completely shaded and the other segment was decorated with vertical lines. The edge of the design was decorated with semi circular patterns. The front blank portion was decorated with circular designs.
- **MS₁₂**-This design was applied on the silhouette of a circular skirt. At the side portion of the skirt emphasis was given by decoration with butterfly motif. The butterfly motif was filled with Madhubani border designs. An emphasis was given to the design by the sting of the butterfly.
- **MS₁₃**- This design was an informal one drawn at the left bottom of the skirt. Two curved lines were drawn over which petal like designs were drawn. Leaf designs were also drawn over that filled with diagonal lines. Checks were also used in the design.
- **MS₁₄**-This design was applied on semicircular skirt. It was drawn from waistline till the knee level on the skirt. This design comprised of curved lines forming triple folds on petals, within which two bird motifs facing each other was drawn.
- **MS₁₅**-On a semicircular skirt, semi circular motifs were drawn. The motifs were arranged horizontally in alternating manner along the bottom of the skirt. The motifs were arranged in the four layers. The semicircular motifs were enriched with diagonal lines with semicircle at the centre.
- **MS₁₆**- The design MS₁₆ was done on a semi circular skirt. A Madhubani fish motif was drawn inside a circle. The body of the fish was decorated with lines and semicircles. The semi circular design was drawn along the side of the circle. The

motifs were placed continuously along the bottom of the skirt at an equal interval. A border line was drawn on top of the motifs. The rest of the portion was slightly shaded.

- **MS₁₇**- On a semicircular skirt, madhubani inverted full lotus motif was drawn at the waistline. The motif was filled with stripes. The petal of the lotus flowers was drawn throughout the bottom of the skirt. A semicircle was drawn on top of each motif to smoothen the design.
- **MS₁₈** - On a semicircular skirt, design at the waistline was done with horizontal lines forming segments. Each segment was beautified with fish motif, triangular and semicircular shapes with diagonal line patterns. To emphasis the informal effect two elongated diamond motifs were used.
- **MS₁₉** - On a semicircular skirt, at the border peacock motif was used. At the top, over two horizontal lines semicircular designs were drawn.
- **MS₂₀** – This design was drawn on a semi circular skirt with triangles at the border. Each triamgle comprised of diagonal lines with centre line. A continuous border design was drawn from the waist line till the bottom edge of the skirt. This border was designed with two petals, triangular designs and semicircles at the edges.
- **MS₂₁**- This design was done with a triangular pattern at the centre around which circles were drawn. The triangular motifs comprised of horizontal lines and in each segment triangles, semicircles and vertical lines were also drawn.
- **MS₂₂** – This design comprised of decoration at the waist line. It formed an informal pattern with curved diagonal lines forming segments. Each segment comprised of triangles, vertical lines and floral motifs.
- **MS₂₃** – This design comprised of petal motifs filled with border designs depicting the Madhubani patterns. The size of the petals varied from smallest at the waistline to the biggest at the bottom. About five rows were formed expressing progression in designs.
- **MS₂₄** – On a panel skirt, sun motif was drawn with triangular outline. Each panel was decorated with this sun motif.

- **MS₂₅** – This was designed on a semicircular skirt with elaborate sun motif at the centre. A semi circular design with zigzag line at the edges and circle at the centre were used at the waist line. A similar motif was applied at the bottom of the skirt.

These manual sketches were assessed and first ten sketches were selected for further study. The proforma utilised for evaluation is given in Appendix – III.



MS₁

MS₂

MS₃

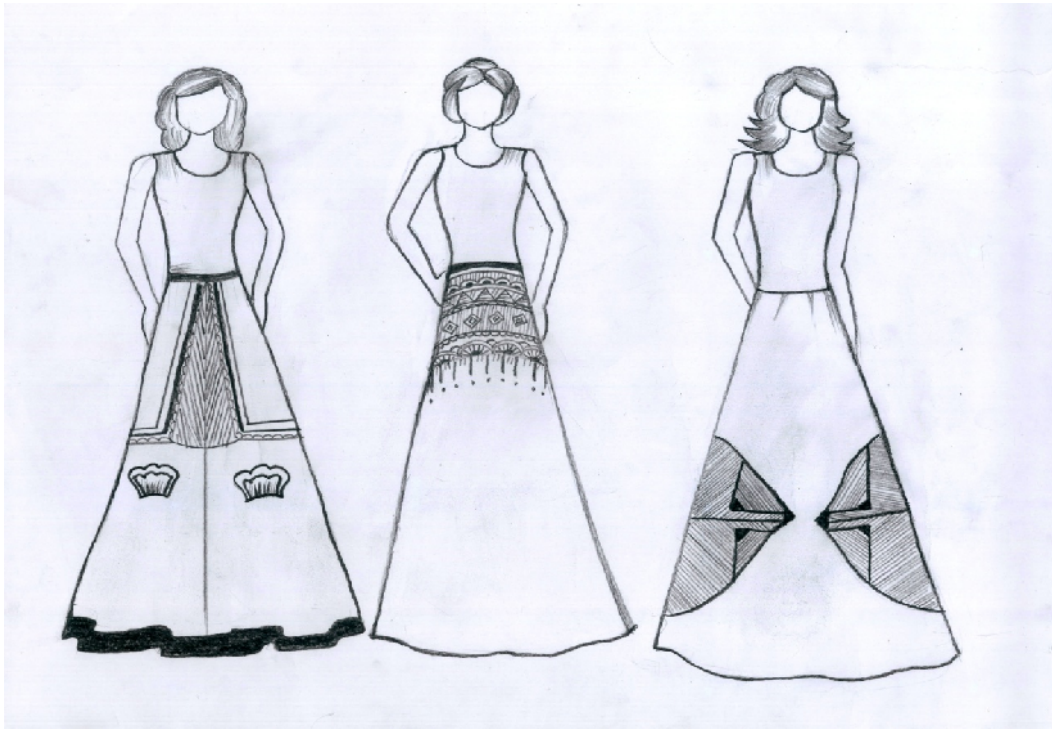


MS₄

MS₅

PLATE - II (a)

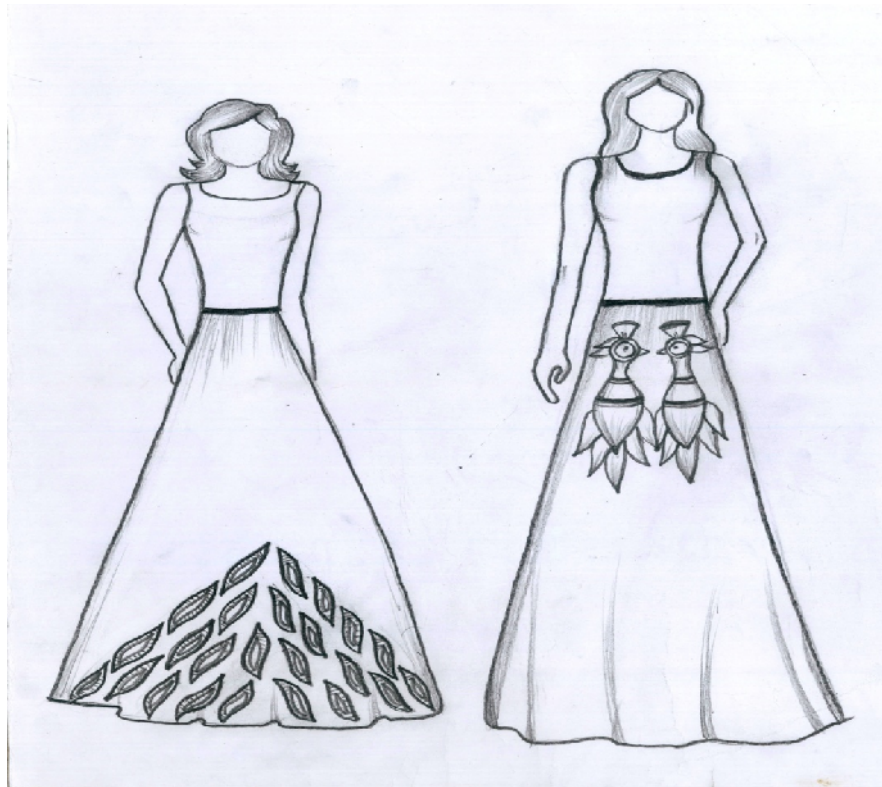
MANUAL SKETCHES OF SKIRT (MS)



MS₆

MS₇

MS₈



MS₉

MS₁₀

PLATE - II (b)

MANUAL SKETCHES OF SKIRT (MS)



MS₁₁

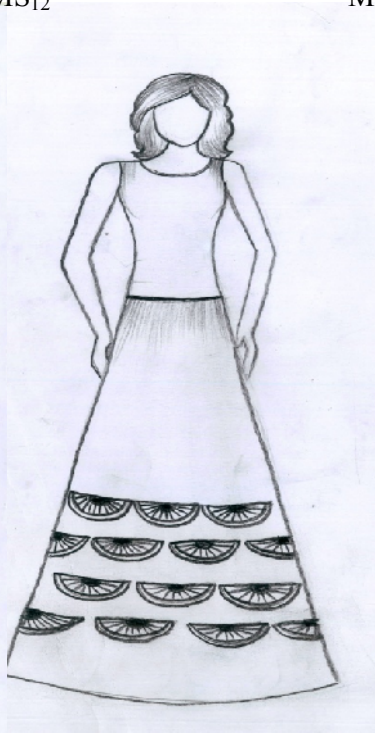


MS₁₂

MS₁₃



MS₁₄



MS₁₅

PLATE- II (c)
MANUAL SKETCHES OF SKIRT (MS)



MS₁₆

MS₁₇

MS₁₈

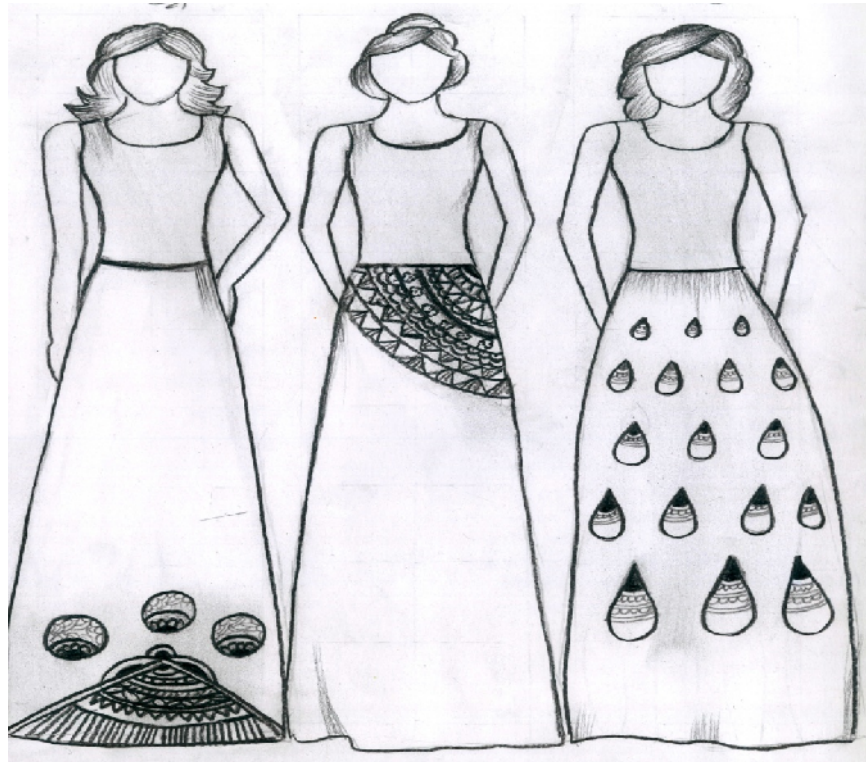


MS₁₉

MS₂₀

PLATE- II (d)

MANUAL SKETCHES OF SKIRT (MS)



MS₂₁

MS₂₂

MS₂₃



MS₂₄

MS₂₅

PLATE- II (e)
MANUAL SKETCHES OF SKIRT (MS)

3.4.2 Evaluation and selection of manual sketches

The twenty five designs developed for the Madhubani art were displayed to find the preference of the adolescent girls. The manual sketches were assessed. From their preferences, ten designs were selected for manual colour sketching. Thus prepared manual sketches were evaluated and ten sketches were selected for further study. The proforma utilized for evaluation is given in Appendix- IV.

3.4.3 Preparation of Manual Colour Sketches

The manual colour sketches (MCS) were prepared for the skirts. This is expressed in the Plates – III (a) and (b) .

The prepared coloured sketches were assessed and four best sketches were selected from them. The proforma used for this selection is given in Appendix – IV.



MCS₁

MCS₂



MCS₃



MCS₄



MCS₅

PLATE—III (a)
MANUAL COLOURED SKETCHES OF SKIRT (MCS)



MCS₆



MCS₇



MCS₈



MCS₉



MCS₁₀

PLATE—III (b)
MANUAL COLOURED SKETCHES OF SKIRT (MCS)

3.4.4 Evaluation and selection of manually coloured sketches

The ten designs which were selected from manually sketched designs were developed and colour combinations were given to it according to the colour harmony. These were assessed and the preference of the subjects were found out by displaying the manually coloured sketches. From their preferences, four designs were chosen for computer aided designing and construction of skirts.

3.5 COMPUTER AIDED DESIGNING

The CAD systems allow making of two dimensional and three dimensional product illustrations and visuals. It is possible to create computer aided garment patterns, gradations and a virtual first pattern of the model (Dabolina and Villumsone, 2012). So Computer Aided Designing was involved in the study.

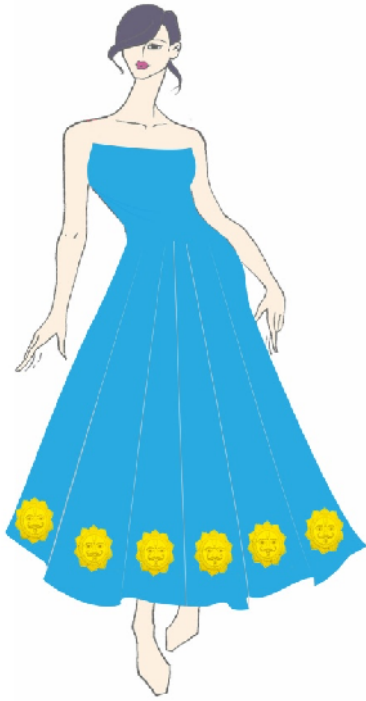
3.5.1. CAD Application

The four selected manual coloured sketches were converted into Computer Aided Designs and kept for evaluation. The proforma used for evaluation has been presented in Appendix – V. The corel draw software was used to design the selected skirt designs by the following procedure.

First the croqui was drawn using pen tool and shaped using shape tool. The outline of the garment is drawn using pen tool and bezier tool. The edges of the garment were given a soft and smoothened appearance using smooth tool. Colour eye dropper tool was used for selecting the colours from the image and colour board and filling the garment with colours. Free hand tool and shape tools were used in drawing the motifs used in the garment design. The motifs present in the fabric is rendered using free hand tool. This procedure was used for designing all four Computer Aided Designed (CAD₁ to CAD₄) garments, relating to Madhubani art.

3.5.2 Evaluation and selection of CAD Designs

The designs were assessed according to the preference of the subjects with the help of visual aids. As per their preferences the pictures were selected for garment construction. (Plate-IV).



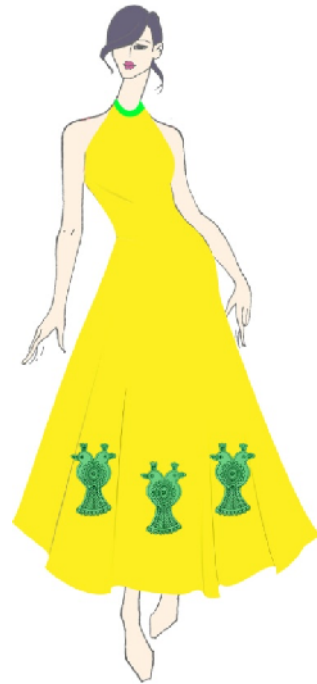
CAD₁



CAD₂



CAD₃



CAD₄

PLATE—IV
CAD DESIGNS

3.6 HAND PAINTING ON FABRIC

Based on the evaluation, design number CAD₁- CAD₄ were selected for hand painting. The selected Madhubani motifs were hand painted on the respective fabrics. The hand painting was done with suitable fabric colours and paint brushes. Painting brushes of different sizes were used for painting the motifs conveniently. (Plate- V)



PLATE- V
HAND PAINTING ON FABRIC

3.7 CONSTRUCTION OF SKIRTS

Garment construction is one of the basic content of fashion designing. Every fashion designer should have detailed knowledge about the process of garment construction (Jindal, 1998). The skirts were constructed by the following steps.

3.7.1 Selection and Sourcing of the Material

According to the selected four garment designs, Fabrics were sourced. All the materials were procured from the respective shops as per the requirement. Fabrics varied according to the garment design.

Raw silk is nothing but sericin containing silk (www.britannica.com). Raw silk material was selected for the study. It was procured from Arihant Fabrics, Coimbatore.

Silk cotton fabric is a blend of both fibers, containing positive characteristics of each into a single textile. A light weight, silky and comfortable weave, silk cotton fabric has a soft hand – feel and a sturdy, silken drape, along with a versatility that makes it suitable for an extended variety of garment uses. (www.nyfashioncenterfabrics.com). Silk cotton material was selected for the study which was procured from the shop CCD, Coimbatore.

Net is an open Fabric, which is created by connecting the intersections in woven, knitted or crocheted constructions to form a mesh like appearance that will not ravel. Fabric made in a variety of geometric shaped meshes of different sizes and weights (Brown, 2004). Net material was selected for the study which was procured from CPC, Coimbatore.

Crepe is a Fabric with a finely wrinkled or pebble surface and crisp fell (www.goldensilks.com). This material was selected for the study and was purchased from Arihant Fabrics, Coimbatore. The Fabric swatches are given in Appendix-.VI.

3.7.2 Drafting

Drafting is defined as a method of drawing patterns on paper with mechanical precision using body measurements. A good drafting makes a good fit. Drafting enhances the accuracy of cutting, stitching and fitting of an attire when worn. It is one of the important steps in achieving good fitting of a garment (Patil et al., 2011). Paper patterns

were prepared for skirts based on standardized measurements. The instructions followed for drafting skirt are given in Appendix- VII respectively.

3.7.3 Alteration and transfer of pattern

The basic skirt pattern was altered according to the designs selected namely circular, semicircular and Panel skirts. The preparation of fabric was done by washing, drying and pressing before it was cut. After thorough pressing of the fabric, trial layouts were made by keeping weights or 2 pins per pattern to make sure that the cloth would be sufficient. Straight grain line on patterns was kept parallel to the fabric selvedge. To ensure this, the pattern was measured, adjusted and pinned on the Fabric as suggested by Saluja (2006). Seam allowances width varies with the garment type. No seam allowance is required on the fold line. It is important that seam allowances added to the pattern are accurate and clearly marked (Aldrich, 2003). Accordingly, the paper patterns were placed on the fabric in the most economical way. Adequate seam allowances were left for each piece. Pattern details namely fold line, grain line, name of the pattern and cut number were followed while placing them on the fabric.

The drafted and altered patterns were transferred using different tools namely tailor's chalk and tracing wheel suitable for various materials namely silk cotton, crepe, raw silk, netted. After transferring the pattern, the fabric was cut according to the outline with appropriate seam allowances.

3.7.4 Construction of skirt

Every collection was very carefully researched and planned so that all the items in it complements with each other and have basic principles and elements of design like line, shape, value, colour, proportion, balance, unity, rhythm, emphasis and their application to fashion. All these elements were used while constructing the garment (Plate-VI)

Garment – 1 (G₁)

Panel skirt was constructed with ten panels. The panels were attached. Then the waistband and draw strings were attached. The hemline of the skirt was finished.

Garment – 2 (G₂)

The circular skirt was constructed. A panel was attached on one side of the skirt. The waistband was finished with elastic and then the bottom hemline was finished.

Garment – 3 (G₃)

The semi circular skirt was constructed. The side seams were attached. The border was attached to the bottom of the skirt. The placket was finished with fastener and waistband was attached along with drawstring. The hemline was finished.

Garment – 4 (G₄)

The construction of semi circular skirt was made. The side seams were finished. The placket opening was finished with using a fastener and the waistband was finished with elastic. The bottom hemline was finished.



G₁



G₂



G₃



G₄

PLATE- VI
CONSTRUCTED GARMENTS

3.8 EVALUATION OF THE CONSTRUCTED GARMENTS

The constructed garments were evaluated in two ways as explained below.

3.8.1 Visual inspection

The visual inspection was made by twenty judges of post graduate students of Textiles and Fashion Apparel of Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore. The garment design, colour selection, painting and overall appearance were studied. The proforma used for the visual assessment is presented in the Appendix – VIII.

3.8.2 Feedback through Self Assessment

The garments were made to wear by the subject and feedback was obtained through self assessment about the principles of good fit namely ease, line, grain, set and balance. The proforma used for the self assessment presented in the Appendix – IX.

3.9 COST ESTIMATION

The cost of the material, decorations, trimmings, paintings and stitching were calculated for the garments G₁, G₂, G₃ and G₄, and recorded.

4. RESULTS AND DISCUSSION

The results pertaining to the study and their respective discussions are presented under the following headings.

4.1 Manual sketches

4.2 Manual coloured sketches

4.3 Designs created with CAD

4.4 Visual inspection of skirt garment

4.5 Feedback through self assessment

4.6 Cost estimation

4.1 MANUAL SKETCHES

The findings of the manual sketches are presented in Table – II.

TABLE -11
MANUAL SKETCHES (%)

S.No.	Design Code	Excellent	Very Good	Good	Fair
1	MS ₁	80.0	13.4	6.6	-
2	MS ₂	90.0	8.0	2.0	-
3	MS ₃	93.4	5.4	1.2	-
4	MS ₄	73.3	20.0	6.7	-
5	MS ₅	80.2	14.4	5.4	-
6	MS ₆	66.6	30.0	1.4	2
7	MS ₇	83.4	10.6	6.0	-
8	MS ₈	70.0	14.0	9.5	6.5
9	MS ₉	81.7	10.3	4.8	3.2
10	MS ₁₀	73.2	23.4	3.4	-
11	MS ₁₁	83.8	10.5	3.7	2
12	MS ₁₂	76.6	16.2	7.2	-
13	MS ₁₃	66.6	26.6	4.5	2.3
14	MS ₁₄	75.5	20.5	4.0	-
15	MS ₁₅	74	18.0	4.6	3.4
16	MS ₁₆	93.2	4.4	2.4	-

17	MS ₁₇	66.6	16.7	11.8	4.9
18	MS ₁₈	76.6	20.0	3.4	-
19	MS ₁₉	86.3	9.7	2.5	1.5
20	MS ₂₀	82.4	10.4	7.2	-
21	MS ₂₁	63.4	30.0	6.6	-
22	MS ₂₂	70.0	26.6	1.9	1.5
23	MS ₂₃	73.3	17.8	5.6	3.3
24	MS ₂₄	96.6	2.2	1.2	-
25	MS ₂₅	82.1	12.6	5.3	-

From the Table – II, it is obvious that the maximum rating of 96.6 per cent was noticed in sample MS₂₄ to be excellent followed by samples MS₃ (93.4 per cent), MS₁₆ (93.2 per cent), MS₂ (90.0 per cent), MS₁₉ (86.3 per cent), MS₁₁ (83.8 per cent), MS₇ (83.4 per cent), MS₂₀ (82.4 per cent), MS₅ (80.2 per cent). The designs namely MS₁, MS₄, MS₈, MS₁₀, MS₁₂, MS₁₄, MS₁₅, MS₁₈, MS₂₂ and MS₂₃ were rated between 70 - 80 per cent of judges to have excellent general appearance. And the designs MS₆, MS₁₃, MS₁₇ and MS₂₁ were rated below 70 per cent to have excellent general appearance.

Hence it could be concluded that ten of the designs namely MS₂, MS₃, MS₇, MS₉, MS₁₁, MS₁₄, MS₁₆, MS₁₉, MS₂₀ and MS₂₄ had excellent general appearance.

4.2 MANUAL COLOURED SKETCHES

The findings of the manual coloured sketches are presented in Table – III.

TABLE - III
MANUAL COLOURED SKETCHES (%)

S.No.	Design Code	Excellent	Very Good	Good	Fair
1	MCS ₁	89.5	8.5	2	-
2	MCS ₂	93.6	4.9	1.5	-
3	MCS ₃	72.0	21.6	4.2	2.2
4	MCS ₄	70.0	16.5	10.0	3.5
5	MCS ₅	76.3	14.0	6.7	3
6	MCS ₆	68.5	24.5	4.5	2.5
7	MCS ₇	87.0	9.5	3.5	-
8	MCS ₈	74.5	18.6	6.4	-
9	MCS ₉	78.4	15.6	6.0	-
10	MCS ₁₀	96.5	2.3	1.2	-

From the Table – III, it is obvious that the maximum rating of 96.5 percent was noticed in sample MCS₁₀ followed by the samples MCS₂ (93.6 per cent), MCS₁ (89.5 per cent), MCS₇ (87 per cent).

The design MCS₉ was rated with 78.4 percent and the design MCS₅ was rated 76.3 per cent. The design MCS₈ was rated with 74.5 per cent followed by the designs MCS₃ and MCS₄ with 72 and 70 percent ages respectively.

Hence it could be concluded that the designs MCS₁₀, MCS₂, MCS₁ and MCS₇ were excellent in overall appearance.

4.3 DESIGN CREATED WITH CAD

The results obtained by assessment of computer aided designing are presented in the Table – IV.

TABLE – IV
DESIGNS CREATED WITH CAD

S.No.	Design Code	Excellent	Very Good	Good	Fair
1	CAD ₁	97.3	1.5	1.2	-
2	CAD ₂	83.4	10.0	4.6	2
3	CAD ₃	90.0	3.4	6.6	-
4	CAD ₄	86.6	7.5	4.3	1.6

From the Table – IV, it is clear that the design CAD₁ was rated to have excellent general appearance by 97.3 per cent of judges. The design CAD₃ was rated with 90 per cent and the design CAD₄ was rated to have general appearance by 86.6 per cent of judges. The design CAD₂ was rated with 83.4 per cent.

Hence it could be concluded that the ranking of the Computer Aided Designs was in the order CAD₁, CAD₃, CAD₄, CAD₂ as per their assessment of the judges.

4.4 VISUAL INSPECTION OF SKIRT GARMENT

The results of the visual inspection of skirt are presented in the Table – V.

TABLE – V
VISUAL INSPECTION OF SKIRT

S. No.	Garment	Design				Colour selection				Trimmings and decoration				Overall appearance			
		Excellent	Very Good	Good	Fair	Excellent	Very Good	Good	Fair	Excellent	Very Good	Good	Fair	Excellent	Very Good	Good	Fair
1	G ₁	90	8	2	-	90	6	5	-	80	10	10	-	94	6	-	-
2	G ₂	98	2	-	-	93	4	3	-	81	14	5	-	100	-	-	-
3	G ₃	86	9	5	-	88	7	5	-	74	20	6	--	86	14	-	-
4	G ₄	71	18	9	2	80	18	2	-	70	20	7	3	84	11	3	2

From the Table – V, it is clear that the maximum of 98 per cent of judges rated the garment G₂ as excellent in design followed by the garments G₁, G₃ and G₄ with 90, 86 and 71 percentages respectively.

The maximum of 93 per cent of judges rated G₂ to have excellent colour selection followed by the garments G₁, G₃ and G₄ with 90, 88 and 80 percentages respectively.

As for the trimmings and decorations are concerned, the maximum of 81 per cent of judges rated the garment G₂ as excellent followed by the garments G₁, G₃ and G₄ with 80, 74 and 70 percentages respectively.

The overall appearance was rated as excellent by 100 percent judges for the garment G₂ and G₁ was rated by 94 per cent of judges, followed by the garments G₃ and G₄ with 86 and 84 percentages respectively.

Hence it could be concluded that the garment G₂ had excellent colour selection, design, trimmings, decorations and overall appearance

4.5 FEEDBACK THROUGH SELF ASSESMENT

The Feedback through self-assessment is presented in the Table - VI

TABLE - VI
FEEDBACK THROUGH SELF-ASSESSMENT

S. No.	Garment	Ease				Line				Grain				Set				Balance			
		Excellent	Very Good	Good	Fair	Excellent	Very Good	Good	Fair	Excellent	Very Good	Good	Fair	Excellent	Very Good	Good	Fair	Excellent	Very Good	Good	Fair
1	G ₁	86	10	4	-	86	8	5	1	84	14	2	-	86	13	1	-	80	18	2	-
2	G ₂	92	6	2	-	88	9	3	-	86	10	4	-	90	7	3	-	94	4	2	-
3	G ₃	84	10	4	2	82	13	3	2	72	18	10	-	80	18	2	-	82	13	5	-
4	G ₄	80	14	6	-	76	19	2	3	70	15	12	3	74	21	3	2	78	20	2	-

Ease

From the Table - VI, it is clear that the maximum of 92 per cent of the subjects rated garment G₂ to have excellent ease followed by the garments G₁, G₃ and G₄ of 86, 84 and 80 percentages respectively.

Line and grain

As for the line and grain of the garment is concerned the garment G₂ was rated 88 and 86 percentages respectively to have excellent line and grain, followed by the garments G₁, G₂, G₃ and G₄ with 86, 82 and 76 percentages respectively for line and 84, 72 and 70 percentages respectively for grain.

Set

As for the set of the garment is concerned, the garment G₂ was rated 90 per cent to have excellent set followed by the garments G₁, G₃ and G₄ with 86, 80 and 74 percentages respectively.

Balance

The balance was rated to be excellent by 94 per cent of subjects for the garment G₂ followed by G₁, G₃ and G₄ with 82, 80 and 78 percentages respectively.

Hence it could be concluded that the garment G₂ had excellent ease, line, grain, set and balance.

4.6 COST ESTIMATION

The cost estimation is presented in the Table - VII

TABLE - VII
COST ESTIMATION

S. No.	Garment Code	Particulars	Cost (Rs)	Total Cost (Rs)
1	G ₁	Material cost	490	1,500
		Trimmings and decorations	10	
		paintings	300	
		stitching charge	700	
2	G ₂	Material cost	635	1,475
		Trimmings and decorations	40	
		paintings	300	
		stitching charge	500	
3	G ₃	Material cost	455	1,350
		Trimmings and decorations	95	
		paintings	250	
		stitching charge	550	
4	G ₄	Material cost	420	1,155
		Trimmings and decorations	85	
		paintings	300	
		stitching charge	350	

From the Table - VII, it is clear that the cost incurred for material, designing and construction of the samples namely G₁, G₂, G₃ and G₄ were Rs. 1,500, Rs. 1,475, Rs. 1,350, and Rs. 1,155 respectively.

The cost of constructed skirts ranged from Rs. 1,500 to Rs. 1,155 which is affordable by middle income groups.

5. SUMMARY AND CONCLUSION

INTRODUCTION

The term "Fashion" is frequently used as a synonym for glamour and style. Fashion doesn't limit itself to dressing but is an expression of the mood and taste of an individual. Fashion refers to change, which is inevitable.

A design is a composition of silhouette, colour, texture and details which create specific versions or variations of a style. Design is an organization when anything is designed, it is put together with some intent or goal in mind. Design is defined as a particular purpose held in view by an individual or group, it is the arrangement of elements or details in the product or work of art and a decorative pattern.

The tradition of painting has been carried on in the Indian subcontinent since the ancient times. Standing as a testimony to this fact are the exquisite murals of Ajanta and Ellora, Buddhist palm leaf manuscripts, Mughal and Kangra schools of miniature Indian paintings, etc.

Madhubani literally means "*forest of honey*". This art form which dates back to the 7th century is from the Mithila area – specifically Madhubani village of Bihar; hence also called Mithila paintings. Madhubani District is one of the thirty-eight districts of Bihar State, India. Bound on the north by a hill region of Nepal and extending to the border of its parent district Darbhanga in the south, Sitamarhi in the west and Supaul in the east. Madhubani has five sub-divisions namely Madhubani, Jaynagar, Benipatti, Jhanjharpur and Phul Paraas and 20 community development blocks.

Surface designing refers to superficial embellishment on the fabric or structural and applied design on any substrate. There are innumerable varieties of decorations that enrich the fabric surface but techniques limited to substrate sources. Hand painting involves use of dye or pigment with media applied to textiles are was fast when used on suitable fabric. Some paints though resemble dyes are not wash fast. Different types of paint have different appearance.

Skirt is something that covers the lower part of the body especially for girls, women or ladies. Skirts come in a variety of shapes and styles and they are essential items in women's wardrobes. Skirts are more elegant and easy to wear and besides they can be

worn in all occasions. Changing the silhouette of a skirt is one of the focal points for designers who wish to change the look and direction of fashion.

Standard measurements are given set of measurements that comply with a commercial sizing. These measurements are a result of extensive anthropometric studies carried out on different age groups. Heights and girths.

CAD, or computer aided design and drafting (CADD), is the use of computer technology for design documentation. CAD software replaces, manual drafting with an automated process (www.autodesk.com). Computer graphics can also show the repeat of a fabric pattern, simulate fabric drape on the figures and help designers experiment with colours and fabric changes quickly.

Keeping these facts in mind, the investigator has made a study on "Madhubani Art – A Design Inspiration to Develop Motifs for Hand Painting on Skirts" with the following:

- 4 To select the inspired madhubani designs.
- 5 To hand paint the selected motifs on fabric.
- 6 To construct skirts for adolescent girls.

METHODOLOGY

- The random sampling method was used to gather information for the study as careful selection of sample will give good results. The samples selected were a randomly selected group of adolescent girls.
- Various body measurements taken for the construction of skirts are waist circumference, hip circumference, skirt length. These measurements were standardized.
- The motifs from Madhubani art which were inspiring were selected for the study. The common motifs like birds, fish, sun and borders were developed into designs by arranging in proper fashion.
- The selected Madhubani designs were developed suitable for the skirts through manual sketching, which was selected based on the preference of the adolescent girls.
- Ten manual sketches were selected from twenty five sketches according to the preferences.

- The preferred 10 manual sketches were further sketched using colour media. These 10 manually coloured sketches were ranked according to the preference of the adolescent girls and 4 sketches were selected.
- These 4 sketches were further designed using CAD. Corel Draw software was used. Various tools like pen tool, shape tool, colour eye dropper tool, rectangular tool, ellipse tool, beizer tool, smooth tool, freehand tool and selection tool was used in designing the selected four garments.
- The designs were assessed according to the preference of the subjects with the help of visual aids. As per their preferences the pictures were selected for garment construction.
- Based on the evaluation, design number CAD₁- CAD₄ were selected for hand painting. The selected Madhubani motifs were hand painted on the respective fabrics. The hand painting was done with suitable fabric colours and paint brushes. Painting brushes of different sizes were used for painting the motifs conveniently.
- According to the selected four garment designs, Fabrics were sourced. All the materials were procured from the respective shops as per the requirement. Fabrics varied according to the design of the garment.
- Paper patterns were prepared for skirts based on standardized measurements.
- The basic skirt pattern was altered according to the designs selected namely circular, semicircular and Panel skirts. The pattern details such as grain line, seam lines, name of the pattern, cut number and with grain, against the grain were marked on the pattern. The preparation of fabric was done by washing, drying and pressing before it was cut.
- Trial layouts were made in the most economical way. Adequate seam allowances were left, for each piece of the fabric.
- The drafted and altered patterns were transferred on the materials namely, crepe, net, silk cotton) using tailors chalk and tracing wheel. After transferring, the fabrics were cut accordingly with seam allowances.
- The visual inspection was made for the garments by the judges by making the subject to wear the garments.
- The self assessment about the garment was made by the subject herself by wearing the garments to evaluate certain salient features about good fit namely ease, line, grain, set and balance.

FINDINGS OF THE STUDY

- The ten designs namely MS₂, MS₃, MS₇, MS₉, MS₁₁, MS₁₄, MS₁₆, MS₁₉, MS₂₀ and MS₂₄ were rated the highest as per the judges view regarding the general appearance.
- The four designs namely MCS₁₀, MCS₂, MCS₁ and MCS₇ had excellent appearance and colour combination according to judges view.
- The four CAD designs namely CAD₁, CAD₃, CAD₄, CAD₂ were ranked by the judges according to their preferences.
- The garment G₂ had excellent colour selection, design, trimmings and decorations and overall appearance.
- The garment G₂ had excellent ease, line, grain, set and balance as for the principles of good fit.
- The cost of the constructed garments were more economical for middle income groups and can be preferred by all the income groups.

CONCLUSION

It could be concluded that the inspired traditional Madhubani motifs were beautifully hand painted on fabrics for skirts. The selected Madhubani designs were liked by the adolescent girls. The colours preferred and constructed garments were well appreciated by the adolescent girls.

RECOMMENDATION

- The same style of Madhubani painting can also be done on other garments for any age group.
- Other traditional paintings may also be done on the garment for same age group.

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APPENDIX- I

VARIOUS BODY MEASUREMENTS OF SKIRT FOR ADOLESCENT GIRLS

s. no	Sample of measurement (cms)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Waist circumference	76	77	75	77	77	76	75	76	76	76	74	76	74.2	76	77	75	76	77	75	76	78	76	77	76	75
2	Hip circumference	91	91	9	92	96	91	95.7	91	91	91	91	91	91.8	91	92.4	95	91	96	95	91	93	91	90	92	91
3	Skirt length	103	102	100	102	98	103	103	103.9	104	103	104	103	102	100	103	102	100	103	98	100	103	101	103	104	102

APPENDIX- II

STANDARDIZED MEASUREMENT CALCULATION

A sample calculation of standardized measurements for waist and hip is given below using individual observation method.

- Waist circumference - 76, 77, 75, 77, 77, 76, 75, 76, 76, 76, 74, 76, 74.2, 76, 77, 75, 76, 77, 75, 76, 78, 76, 77, 76, 75.

- Modal value - 76 cm, because its frequency is 11, is higher than others.

APPENDIX - III

PROFORMA TO ELICIT INFORMATION REGARDING PREFERENCE OF MANUAL SKETCHED GARMENT SILHOUETTES

S No.	Design Code	Excellent	Very Good	Good	Fair
1	MS ₁				
2	MS ₂				
3	MS ₃				
4	MS ₄				
5	MS ₅				
6	MS ₆				
7	MS ₇				
8	MS ₈				
9	MS ₉				
10	MS ₁₀				
11	MS ₁₁				
12	MS ₁₂				
13	MS ₁₃				
14	MS ₁₄				
15	MS ₁₅				
16	MS ₁₆				
17	MS ₁₇				
18	MS ₁₈				
19	MS ₁₉				
20	MS ₂₀				
21	MS ₂₁				
22	MS ₂₂				
23	MS ₂₃				
24	MS ₂₄				
25	MS ₂₅				

APPENDIX - IV

**PROFORMA TO ELICIT INFORMATION REGARDING
PREFERENCE OF MANUAL COLOUR SKETCHED GARMENT
SILHOUETTES**

S No.	Design Code	Excellent	Very Good	Good	Fair
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

APPENDIX - V

PROFORMA TO ELICIT INFORMATION REGARDING FEEDBACK OF SKIRTS DESIGNED THROUGH CAD

S No.	Design Code	Excellent	Very Good	Good	Fair
1	CAD1				
2	CAD2				
3	CAD3				
4	CAD4				

APPENDIX - VI

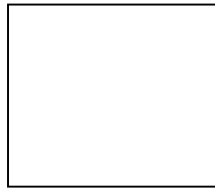
FABRIC SWATCHES



G₁



G₂

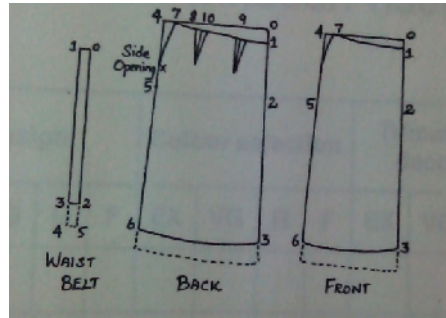


G₃



G₄

APPENDIX – VII
INSTRUCTIONS FOR DRAFTING BASIC SKIRT
(FRONT AND BACK)



Front : Square lines from 0, fold at 3-0

- 1-0 = 2cm
- 2-1 = 17.5cm for seat line
- 3-1 = length less beltwidth + 1cm
- 4-0 = $\frac{1}{4}$ seat - 4cm
- 5 is located at 17.5cm from 4 and $\frac{1}{4}$ seat - 1.5cm from 2. Join 4-5 and produce to 6
- 6-4 = 3-1 to 1.5 cm
- 7-1 = $\frac{1}{4}$ waist + 1cm. Shape 7-5, 1-5 and 3,5 as shown

Back : Same as front side from 1-7

- 8-1 = $\frac{1}{4}$ waist + 1cm
- Divide 1-7 in 4 equal parts, viz, 1-9, 9-10 and 10-7
- Take darts at 9-10, keeping the width equal to half of 8-7, and the length upto 10cm
- Keep 5cm below 6-3 (of front and back) for inturns
- X-7 = $\frac{1}{8}$ seat for wide opening
- Fix zip fastener at 7.5

Waist Belt

- Square lines from 0
- 1-0 = 4cm or to taste
- 2-0 and 3-1 = same as waist
- Keep 4 to 5 cm extra at 2-3

APPENDIX - IX

PROFORMA TO ELICIT INFORMATION REGARDING FEEDBACK OF SKIRT OUTFITS THROUGH SELF ASSESSMENT FROM WEARER

S. No.	Garment Code	Ease				Line				Grain				Set				Balance			
		Excellent	Very Good	Good	Fair	Excellent	Very Good	Good	Fair	Excellent	Very Good	Good	Fair	Excellent	Very Good	Good	Fair	Excellent	Very Good	Good	Fair
1	G ₁																				
2	G ₂																				
3	G ₃																				
4	G ₄																				