-‘DESIGN AND DVELOPMENT OF MULTIWEAR GARMENT FOR ADOLESCENT’

MONIKA R

(20PBX005)

A Thesis Submitted to the

Avinashilingam Institute for Home Science and Higher

Education for Women

Coimbatore-641043

In partial fulfilment of the requirement for the degree of
MASTER OF SCIENCE BIO TEXTILES

May, 2022

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MAY 2022

Certified as Bonafied Research work

27/5/22

Signature of the Head of the Department

27/5/22

Signature of the Supervisor

DECLARATION

I declare that the dissertation entitled **'DESIGN AND DVELOPMENT OF MULTIWEAR GARMENT FOR ADOLESCENT'** submitted by me for the degree of Master of science (M.Sc.,) is the record of work carried out by me during the period from 2021 to 2022 under the guidance of **Dr. (Tmt.) R.Sunitha,** M.Sc., M.Phil., Ph.D. (Avinashilingam), Assistant Professor (SG), Department of Textiles and Clothing, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore-642 043 and has not formed the basis for the award of any Degree, Diploma, Associate ship, Fellowship, Titles in this University or any other similar institution of higher learning.

R. Monika.

Signature of the Candidate

CERTIFICATE FROM THE SUPERVISOR

I certify that dissertation entitled **"DESIGN AND DVELOPMENT OF MULTIWEAR GARMENT FOR ADOLESCENT"** submitted for the degree of Master of science (M.Sc.,) Bio Textiles by **Monika R** is the record of project work carried out by her during the academic year 2021 to 2022 under my guidance and supervision and this work has not formed the basis for the award of any Degree, Diploma, Associate ship, Fellowship, Titles in this University or any other similar institution of higher learning.

27/5/22

Signature of the Supervisor with Designation

27/5/22

Signature of the HOD

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‘DESIGN AND DEVELOPMENT OF MULTIWEAR GARMENT FOR ADOLESCENT’

1. INTRODUCTION

Multifunctional clothing is a way to make clothes that can be used in different situations or scenarios. The assembling or disassembling features are the systems to provide total comfort to the wearer in making their own choices of functions (Crawford, 2006). The value of multifunctional clothing is determined by the technical aspects of the product. The clothing does not just have a single product design but also series of different functions that can even be practical across several seasons and create a unique production marketing chain. It consists of three main features, namely diversity, flexibility, and continuity (Chen, 2018).

The textile industry in Europe and the United States of waste textile fabrics a year has been close to 100000 tons . It is said to be that 15% of fabric waste throughout the production process. Based on the concept of sustainable increase of fabric, and the modern clothing, clothing design of ecological sustainable development also has an important role."The clothes wear more” clothing design is the design concept of ecological sustainable. For "the clothes wear more" design concept, there are two kinds of interpretation, "seeking common ground" "reserving differences". (Jiangyou, 2008)

Fashion designers work in a variety of different ways when designing their pieces and accessories such as rings, bracelets, necklaces and earrings. Because of the time required to put a garment out in market, designers must anticipate changes to consumer desires. Fashion designers are responsible for creating looks for individual garments, involving shape, color, fabric, trimming, and more (Haute, 2012). A fashion designer conceives garment combinations of line, proportion, color, and texture. While sewing and pattern-making skills are beneficial, they are not a pre-requisite of successful fashion design. Most fashion designers are formally trained or apprenticed. (Hallett, 2021)

A technical designer works with the design team and the factories overseas to ensure correct garment construction, appropriate fabric choices and a good fit. The technical designer fits the garment samples on a fit model, and decides which fit and construction changes to make before mass-producing the garment. (Davis, 2021)

Formal training is usually required for working as a pattern marker.A tailor makes custom designed garments made to the client's measure; especially suits (coat and trousers, jacket and skirt). Tailors usually undergo an apprenticeship or other formal training. A textile designer designs fabric weaves and prints for clothes and furnishings. Most textile designers are formally trained as apprentices and in school. (Ralf, 2003)

Garments cover the body, footwear covers the feet, gloves cover the hands, while hats and headgear cover the head. Eyewear and jewelry are not generally considered items of clothing, but play an important role in fashion and clothing as costume. (Kittler, 2004).

Multifunctional clothing was developed to solve the short usage of clothes because of the fast trend changes. It is caused by different situations or even weather conditions. Moreover, multifunctional clothing will have different functional features, such as the characteristics of the garments, where it is defined by the specific market needs, and creating the concepts that meet those requirements (Song, 2011).

The so-called general clothing of "the clothes wear more" is a piece of clothing can be common in people of different age and different occasions and different form of a design of the human body. Take the "the clothes wear more" is "seeking common ground". From the perspective of the age, "accommodationist" is wearing clothes of all ages in common, the fuzzy boundaries of all ages, make its adjacent ages of clothing are interchangeable in collocation, reduce the age subdivision, design clothing that gm in different age groups, reduce the waste of resources; From the point of view of occasions, "accommodationist" is in different occasions, wearing clothes in common, such as the work of the professional attire, casual entertainment, party of clothing, such as different occasions, wearing clothing type, clothing like dresses, wearing a few times, of waste caused by clothes. This requires designers take on different occasions dress in common, a universal design clothes in different occasion, is advantageous to the clothing enterprise to carry on the unification of the batch production, reduce the waste of spare clothes. From the point of view of form, "accommodationist" is take different bodily form feature in the design of clothing, each person's body is different, by measuring the different form of clothing sizes, movement range, etc., design a general in the design of different forms of clothing style. General clothing"the clothes wear morev " design, expand the scope of adapt to the crowd, enhance the practicability of clothes. (Chengdong Mao 2006)

Considering the above facts, the study entitled **'DESIGN AND DEVELOPMENT OF MULTIWEAR GARMENT FOR ADOLESCENT'** was carried out with the following objectives

Objectives

- Selection of inspired theme
- Construction of theme based multiwear garment
- Estimation of cost of garment
- Analysis of the prepared garment

2. REVIEW OF LITERATURE

The literature pertaining to the study on **'DESIGN AND DEVELOPMENT OF MULTIWEAR GARMENT FOR ADOLESCENT'** is discussed under the following heads.

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2.1 Design and its Types

A design is a plan or specification for the construction of an object a system or for the implementation of an activity in the form of a prototype, process. A design should satisfy certain goals and constraints; may take into account aesthetic, functional, economic, or socio-political considerations; and is expected to interact with a certain environment (Coyne, 2000). Design is a total work process which has different types of overall user perspective and drives specific development totally based on different types of specific customers' needs. Design is creating an element carried out through the creativity, knowledge, and skills of a person or group. (Ralf, 2003)

Design is defined as a process that can take many forms depending on the object being designed and the individual or individual's participation which is put together with some intent or goal in mind (Gross, 2008). The creation of design involves appropriate selecting and organization of fundamental elements Good design only comes about when things are made with attention to both their functional and aesthetic properties. It is the arrangement of elements or details in the product or work of art and a decorative pattern. A design is a surface enrichment of proper fabric or garment by combination of elements and principles of art (Trevallion, 2003). Colour is the aspect that catches the eyes of the consumer first, clothes are observed minutely eyes move from colour and silhouette to the design the dress

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 color, 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, color and texture of an object. In the fabric structural design is formed by stitching together pieces, like collar, cuff, yoke, pleats etc. (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, constituents its decorative design. Decorative designs add luxury of design (Sumathi, 2005). In the fabric, decorative designs are patteming of essentially plain fabric to make them more attractive in appearance. The factors determine the fabric types, processes, colours and motifs used (Digolo 2008) The decorative designs are classified further as explained under

Type of decorative designs

- **Naturalistic design**

These designs represent nature such as flowers, leaves, fruits, animals, landscapes. Every effort is made to keep the motif realistic so that it appears as an exact reproduction (Stecker, 1996).

- **Stylized or Conventional Designs**

These designs do not represent the replica of natural things. It is generally necessary to simplify the form of an object and only the essential characteristics feature need to be abstracted (Tate, 2004)

- **Geometric Designs**

Designs which are purely geometrics result from the embellishment of inter scaling vertical, horizontal, diagonal, circular and radiating lines. Such designs may include conventional form or they may be adaptation of the earlier style (Mullick, 2006).

- **Abstract designs**

These designs are very attractive and visually difficult to find a pattern of the design in a clear form. Inspiration is not recognizable. They are unknown source of designs (Sodhia, 2004).

- **Ethnic designs**

These designs belong to or derive from the cultural, racial religious, or linguist traditions of a people or country. The ethnic styles have their day in western design and then submerge, to reappear whenever someone senses that the time is right for a new twist on the constant demand for a folkloric pattern (www.academia.edu).

2.2 Principles of design in fashion

The principles of design serve as a guide lines for combining elements Again, the way in which these principles are applied affects the expressive content, or the message of the work. Fashion Designers teach Principles of designs in beginning of their student life, so in futures they may not consciously think of these principles as they work but if something is wrong with a design, they are able to analyze the problem in terms of proportions, balance, rhythm, emphasis and unity to create a harmonious design (Singh, 2012).

2.2a Balance

Balance is the distribution of the visual weight of objects, colors, 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).

2.2b Harmony

Harmony is the unity of all the elements to convey a message. The whole dominates the parts in implying agreement visually or conceptually, such elements refer to lines, shape, size, colour, texture, ideas or themes. Harmony is achieved through proximity isolation or variations of the elements (Colussy, 2007). Harmony is colour is not governed by fixed principles and any combination of hues that is pleasing and gives full satisfaction to the observer may be said to constitute harmony. The colour sense in different persons, however, varies being more highly developed in some than in others and what may appear harmonies to one may be more or less in harmonies (Grosicki, 2004).

2.2c Emphasis

Emphasis creates a centre of interest by focusing the viewer's attention on a specific area of the garment. It is basically the use of subordination in various parts in order to emphasize and highlight certain parts (Davis, 2008).

2.2d Rhythm

Rhythm may be defined as a pleasing sense of organized movement that gives continuity to a design. It provides a transition from one unit to another and leads the eye in a fluid movement throughout the design. Without rhythm, a design may appear spotty or disconnected. It results from a regular repeat, or a gradual change giving the feeling of continuity throughout the design (Jacob, 1996).

2.2e Proportion

Proportion includes planning of the basic shape within a design. It may involve the scale of the forms within the design like diversion of space to create attractive space relationship where the variety of shapes, size and the general idea of unity of principles of designs are to be expressed. Optical illusion is created by changing partial arrangements to enhance the attractive position that one wish to enhance (Sumathi, 2002). Proportion refers to the linear sub-division of objects of shapes and concerns the balance of shape. volume, colour, fabric, texture and scale. The combination of these elements make the design of garment infinitely diverse (Kelvey, 2003).

2.3 Elements of design

Designing process involves the combining of known design components in varied ways to create new products. Elements of design are those components which the designers employ in all forms of art and design, whether the designing of garments, music, buildings, paintings and sculptors. Understanding of these elements and using them in different ways enables the designer to produce different art and visual effects (Sodhia, 2004).

2.3a Lines

Lines in clothes are an important part of design. When line is used correctly it becomes a very important factor in the development of a pleasing appearance. The most important lines in our clothes are the outlines of our figure or silhouette Lines can play tucks

on the eyes Line may lead the eye vertically, horizontally or diagonally (Gupta 2005). Line is an element of art that contours, outlines or defines a shape. Lines can be thick or thin, loose, sharp, curvy or straight. A line can simply be a mark that goes from one point to another, or it can be used to outline a form Lines have many characteristics and can be horizontal, vertical, diagonal, blurry or choppy. An appearance of thin vertical lines in the garment form slim outfit for the stout bodies and horizontal lines in the garment gives bulky appearance for the slim bodies. The Line acts as an edge between parts of a garment by divided the area it passes through it. (Stecher, 2006)

2.3b Texture

Texture is the surface quality of an object. A rock may be rough and jagged. A piece of silk may be soft and smooth, and desk may feel hard and smooth (Rastogi, 2009). They can be tactile responsive to physical touch and visual. The texture provides designers with an opportunity to create variety of intricate design in a well defined manner (Evans and Thomas, 2012). The Glossy surfaces reflect more light than dull surfaces and rough surfaces absorb light more unevenly than dull surface. There are mainly four variation of surfaces, rough-matt, rough- glossy, smooth-matt and Smooth-glossy. Real Texture is the actual texture of an object. This may look rough but in fact it is just a smooth piece of paper (Sakar, 2010).

2.3c Colour

Colour plays an important role while illustrating. A picture gets attractive and lively through colours. Various emotions and feelings can express through them. For example red corresponds with anger, danger, fire, youth, strength etc. yellow symbolizes joys, uniqueness, wealth and prosperity (Narang, 2006). Symbolic meanings of colour have psychological connotations. Nevertheless, colours affect us psychological effect regardless of any symbolism. And the psychological effect of are colour can be very different from its symbolical significance. Black may signify mourning, but a black gown or suit, such as tuxedo, is distinguished and elegant as well, depending upon circumstances (Mahadevan, 2008).

2.3d Shape and form

When a line crosses itself or intersects with other lines to enclose a space, it creates a shape. Shape is two-dimensional and has height and width, but no depth. There are varieties of shapes found in nature. It can express the creativity of the designer's ideas very clearly and perfectly (Wilson, 2001). Shape can be used to make irregular and avoid boring, perfect geometric pattern to create aesthetic appearance of a figure (Wissman, 2006),

- Geometric Shapes - Circles, Squares, rectangles, and triangles.
- Organic Shapes - Leaves, seashells, and flowers are organic shapes.
- Positive Shapes - In a drawing or painting, positive shapes are the solid forms (positive space) in a design such as a bowl of fruit. In a sculpture, positive shapes are solid areas of the sculpture that remain after removing portions of the sculpture.
- Negative Shapes - Negative space can include the sky or spaces between objects. In sculpture, the negative space is the portion that is removed from a sculpture.
- Static Shapes - Shapes that appear stable and resting.
- Dynamic Shapes - Shapes that appear to be moving and active (Bettic, 2008).

A three-dimensional object is a defined as volume of space. Forms could also be categorized as geometric or organic in nature (Soudhia, 2008)

2.4 Surface Embellishment

Embellishment basically means adding ornamentation to surface. Material decorations are done on both fabrics and garments. Decorating a garment using decorative and functional accessories or details is referred to as trimming, embroidery, patch work, appliqué, lace, bead work and hand painting (Kaur, 2010).

2.4a Trimming

Trimming can be done in all the parts of the garment such as neckline, yoke, sleeves and bottom by using tucks, ruffles and top stitches (Desai, 2013). Tucks are used singly or clustered or sewn over an entire garment, it range in size from tiny pin tucks to wide, flair too. Ruffles can take a garment from plain and simple to slightly frilly. Both trimming and ruffles are easy to apply, sew on all areas of the garment. It can be made in the same fabric or in a different fabric to add contrast colour (Sulia, 2013)

2.4b Cut work

Fabrics can also be enhanced by using hand cutwork designs, which are drawn on the surface of the fabric, cut away and stitch is applied to stop the raw edges from raveling or fraying. These can be implemented by many sealing technique of edge of the fabric from yarn reveling such as melting, fusing and laser (Stecker, 2013)

2.4c Lace work

Lace work is attaching a strip of decorating laces piece of fabric in the required or selected portion on the garment

Needle Lace – Using needle and create hundreds of tiny button hole or blanket stitches

Bobbin lace – construct by using braiding and twisting threads

Cut work or white work – Making a design and seal it securely using hand stitch or machine and out remove the remaining

Tape or ribbon – Ribbon like readymade lace attach the garment

Knotted face- Using tatting needle to form a pattern of chain and rings trim kinds and loops

Crocheted lace- Using crocheting stitch and make creative motif or design pattern

Construct by knitting patterns on both the side right and wrong of the fabric (Calderin, 2013)

2.4d Applique

Appliqué is a piece of fabric cut separately and attached to the required or suitable place of the garment and secured with stitches, glue or fusing. An appliqué fills only a particular space and not in all over pattern (Corfee 2013)

2.4e Embroidery

Embroidery is an art of using silk thread by piercing with a needle and leading threads with the fabric. It appeared first in china. Later it spread all over the world. Varieties of silk threads are used to make more gorgeous and vivid appearances. Embroidery design can

applied all type of the fabric and garment before sewing or after sewing. There are mainly two type of embroidery, they are hand embroidery and machine embroidery (Heilly, 2014)

2.4f Bead Work

Beads are made from all over world and it comes from different variety of design, styles (Julia, 2013). Bead needles are also available in various size and numbers. Mainly medium size needles are preferred for all types of threads which are available in several size and colour; mostly black and white colour threads are used (www.fibre2fashion.com)

2.4g Hand Painting

Hand painting and printing are used as an area trims. These can be applied on before and after stitching. It is suitable method of formal and casual wear depending on the motif can base fabric used (Kaur, 2010). Painting of garment gives pleasure, creative and ideological look to the garment. After stitching the garment painting a garment is after stitching the edges as it will provide more clean and neat look to the motif (Chan, 2011).

2.5 Galaxy

A galaxy is a gravitationally bound system of stars, stellar remnants, interstellar gas, dust, and dark matter. The word is derived from the Greek galaxias literally 'milky', a reference to the Milky Way galaxy that contains the Solar System.. Galaxies come in three main types: ellipticals, spirals, and irregulars (https://eartheclipse.com/space/types-of-galaxies.html) A galaxy is any of the systems of stars and interstellar matter that make up the universe. Many such assemblages are so enormous that they contain hundreds of billions of stars. Galaxies usually exist in clusters, some of which measure hundreds of millions of light-years across. (https://www.britannica.com/science/galaxy)

2.6 Boards

2.6a Mood board

Graphic designers, interior designers, industrial designers, photographers, user interface designers and other creative artists use mood boards to visually illustrate the style they wish to pursue. Amateur and professional designers alike may use them as an aid for more subjective purposes such as how they want to decorate their bedroom, or the vibe they

want to convey through their fashion. Mood boards can also be used by authors to visually explain a certain style of writing, or an imaginary setting for a story line. In short, mood boards are not limited to interior decorating purposes, but serve as a visual tool to quickly inform others of the overall "feel" of an idea. In creative processes, mood boards can balance coordination and creative freedom. Physical - One way of creating a mood board is using a foam board which can be cut up with a scalpel and can also have spray mounted cut-outs put onto it. Cardboard, paper, and cork-board can also be used as an alternative base for a mood board.Some examples of ideas used to convey a mood are food, music, and colors. Mood boards can be decorated with string, stickers, pretty tape, magazine pictures, original art, original pictures, and fabrics, as well as any other decoration that happens to inspire the creator. They can take the form of various shapes and sizes (Endrissaz 2015)

2.6b Story board

The Fashion storyboard is an industry-inspired method of displaying the original designs. The best storyboards create vivid visual images that are interesting and appealing to viewers. The storyboard “tells the story” of the designer’s idea. The storyboard includes original illustrations and flats, as well as additional materials (such as photos from the Internet or magazines, paper, fabric swatches and patterns which that have influenced the unique design. It also provides the members an opportunity to gain knowledge of the career responsibilities of a fashion designer and illustrator, enhance creativity and originality, and develop visual communication skills. (http://texas4-h.tamu.edu/clothings-textiles#storyboard)

2.6c Colour board

A color mood board is about color. Which would come to reality with color swatches, photos of anything that reflects your color inspiration including landscapes and products. If color vision has a vintage feel, then a photo from a vintage decorating magazine could steer to the perfect color scheme. A color mood board is used for inspiration which puts together a color palette from the vision revealed on the board. It also communicate the mood those colors will create (https://www.thespruce.com)

2.6d Texture board

A swatch is essentially a sample strip cut from a piece of material. It is a small piece of cloth or textile material used as sample of the fabric (Kathryn 2012).

The use of swatches is an essential part of the design process as it enables designers to show the type of fabric to use, demonstrating how colors and different materials and trimmings will look in real terms before going to the trouble of making up a full design. Swatches also offer the advantage of illustrating how colors and patterns will appear on an actual fabric, something that may not be readily apparent from a paper or digital design. (Donze 14) Thus the texture board was prepared after sourcing the material the texture which has been planned for garment making is exhibited in the board

2.6e Customer Profile

A customer profile is a detailed description of your ideal customer. You can have one or several profiles, but you should never have more than 3. If you have too many you lose focus. But bear in mind, that a customer profile is actually a "group" of people, a generalization, and not an actual description of each and every one of your customers. (https://www.apparelentrepreneurship.com/how-to-define-your-customer/)

2.6f Flat Sketches Board

A flat sketch, also called flat drawing and technical flat in the fashion industry, is a technical drawing of a garment as if it were laid flat to show the design details like seams and stitching. It is a black and white CAD (or computer-aided design) drawing that serves as a guide for drafting the pattern design, and is prepared at the beginning of the development stage. This helps both the designer and the patternmaker throughout the entire garment-making process. A flat sketch serves as an essential part of the garment specification sheet—or tech pack—that goes to the patternmaker and sewing team. The drawing gives the patternmaker the information they need about the technical components that make up each garment. https://www.jld-studios.com/2015/12/flat-sketch/

2.6g Final Presentation

Presentation boards are used to identify the theme, mood, or spirit of an idea. The best presentation boards fuse visual and verbal elements into a vivid image. A presentation board

should combine an evocative theme, a visual development of the theme, and a verbal flourish in order to engage the viewer's imagination and awareness. Presentation boards most often focus on a fashion trend or theme that is likely to move into the mainstream Style, look, fabric, color, detail (https://twu.edu/fashion/presentation-boards/)

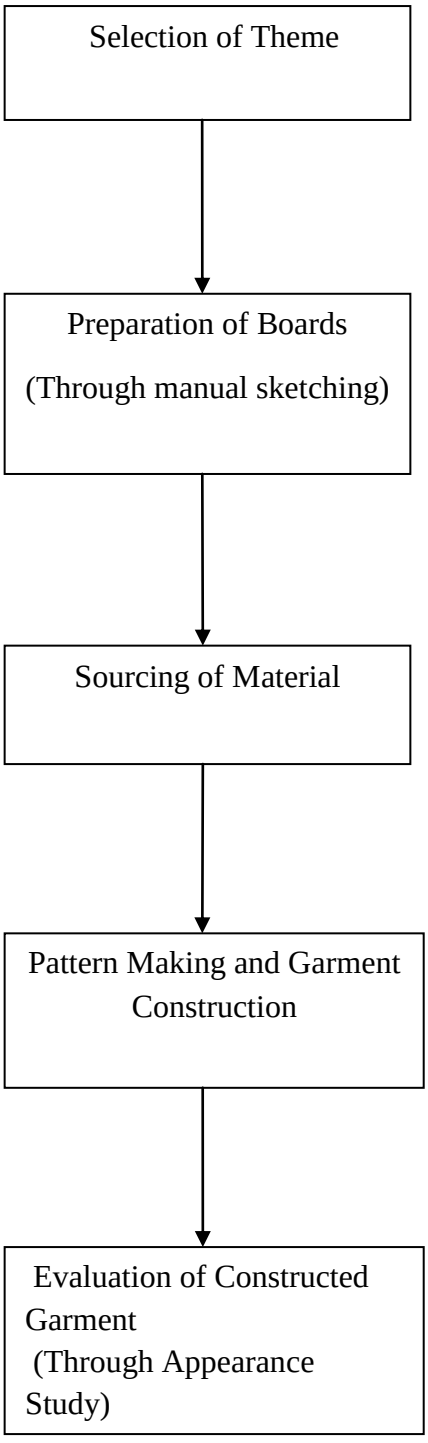
2.7 Multiwear garment

Multi wear dresses are very unique in pattern and fascinating in designs. Multi wear dresses are specially made for various types of special occasions (http://www.indiamart.com). Multiwear kids dresses are very versatile clothing which enables mixing and matching to create beautiful stylish ensemble for kids (http://www.tcnext.com).

Buying one dress and wearing it in casual, semi casual and formal settings, by altering the way it is worn is a wonder made possible by multi wear dresses. Infinite styles can be created with a single dress from conservative patterns to skimpy numbers by wrappings it in different ways. Saving on budget and closet space, multi wear dresses are becoming all the rage. Multi functional garments (also called convertibles and transformers) are articles of clothing that can be worn in more than one way or that serve multiple purposes. They can usually be altered by utilizing attached stripes of cloth, ties, buttons or other built-in modifiers (http://fashion.amillionlives.net)

3. METHODOLOGY

The methodology followed for the study is presented under the following heads



3.1 Selection of Theme

The theme selected for the study was galaxy. The theme inspired was galaxy for its colour and luster in it and with the idea to prepare party wear garment, this was selected. A galaxy is a gravitationally bound system of stars, stellar remnants, interstellar gas, dust, and dark matter. This word is derived from the Greek galaxias literally 'milky', a reference to the Milky Way galaxy that contains the Solar System. Galaxies come in three main types: ellipticals, spirals, and irregulars (https://lovablething.com/products/women-galaxy-hooded-midi-dress)

3.2 Preparation of Boards

The boards prepared based on the theme the galaxy were mood board, story board, colour board, texture board, accessory board, customer profile flat sketches and final presentation.

3.2a Mood Board

A Mood board is a type of visual presentation or a collage consisting of images, text, and samples of objects in a composition. It can be based upon a set topic or can be any material chosen at random. A mood board can be used to convey a general idea or feeling about a particular topic. They may be physical or digital, and can be effective presentation tools. Mood boards can be used for creating brand designs, product designs, website designs, and pretty much any other type of design project (Rachel 2011).Thus the mood board was prepared to expressing the concept of inspiration **(Plate-1)**

3.2b Story Board

The Fashion storyboard is an industry-inspired method of displaying original designs. The best storyboards create vivid visual images that are interesting and appealing to viewers. The storyboard “tells the story” of the designer’s idea. The storyboard includes original illustrations and flats, as well as additional materials such as photos from the Internet or magazines, paper, fabric swatches and patterns which have influenced the unique design (Lury, 2004).Thus the story board was prepared expressing the story of the whole concept in poetic form along with the related pictures **(Plate-2)**

3.2c Colour Board

A color mood board is all about color. The color scheme mood board will come to life with color swatches, photos of anything that reflects the color inspiration including landscapes and products referring the mood board, colour were brought in the colour board to communicate the mood of colours effectively (Lorna, 2009). Thus the colour board was prepared based on the mood board to exhibit the inspired colours in the palette the feeling of the galaxy was well brought in the board through appropriate inspired colour. **(Plate-3)**

3.2d Texture Board

A swatch is essentially a sample strip cut from a piece of material. It is a small piece of cloth or textile material used as sample of the fabric (Kathryn , 2012).The use of swatches is an essential part of the design process as it enables designers to show the type of fabric to use, demonstrating how colors and different materials and trimmings will look in real terms before going to the trouble of making up a full design. Swatches also offer the advantage of illustrating how colors and patterns will appear on an actual fabric, something that may not be readily apparent from a paper or digital design. (Donze 2014).so the texture board was prepared after sourcing the material. The texture which has been planned for garment making was exhibited in this board **(Plate-4)**

3.2e Accessories Board

The accessory board expresses the probable accessories which could be used along with the garment for obtaining a completion in the costume. When it comes to reality **(Plate-5)**

3.2f Customer Profile

The customer profile was prepared to express various aspects such as age, gender, location, occupation, height, weight, occasions, income level and taste of the customer. Through this it was easier to understand and express the needs of the customer and expectation for whom the garment has been designed **(Plate-6)**

3.2g Flat Sketches

The development and formulation of a design requires involvement and in most of the cases follows some or the other process. The process involved should be a course of action that would make reaching the goal very much easier and simpler. Design can be defined to conceive the idea for some system and to express the idea in a form. It would also mean reaching the goals within constraints. The goals consist of the purpose like for whom the design is for and the use of the design. The constraints on the other hand are the materials and the platforms to be used. Overall it is a very challenging job to create a design that is aesthetic, creative and innovative at the same time. So the flat sketches were prepared comprising of four sketches for each selected designs. The designs were for traditional wear, indo western wear and western wear. CAD systems used in apparel design have features similar to those used in textile design. In addition, the systems allow the designer to graphically simulate the drape and appearance of the garment in 3D forms (NIIR Board). Corel Draw software, creativity and power come together in Corel draw, with increased speed, more accurate colour control, enhanced vector illustration tools and new capabilities (WWW.Corel.Com)

To draw an outline of the garment pen tool was used. Using the shape tool, the neckline, side seam, armhole and hemline were given shape. The eyedropper tool was utilized for colour selection to select from the images. Selection tool was used for selecting the particular feature. Rectangle tool and circle tool were used for trimming in the garment. Using freehand tool required lines for the garment were done. Thus about 12 sketches for 3different designs were prepared **(Plate-7)**

3.2h Final Presentation Board

The final presentation board expresses the complete garment with suitable accessories on 9-head croqui. This gives the final appearance of each garment carried out for traditional wear, Indo western wear and Western wear this also was worked using CAD **(Plate-8)**

Plate-1 Mood Board

Plate -2 Story Board

Plate- 3 Colour Board

Plate- 4 Texture Board

Plates 1-4
Prepared Boards

Plate-5 Accessories Board

Plate- 6 Customer Profile

Plate- 7 Flat sketches

Plates 5-7

Prepared Boards

Plate-8aTraditional Wear

Plate-8b Indo western wear

Plate-8c Western wear

Plate- 8 Final Presentation

3.3 Sourcing of Material

The material suitable for the inspired theme was purchased from CPC in Coimbatore city about six meters with 107 cm (42”) width purchased. the inspired colour of galaxy comprising of blue+ lavender+ glittering white was purchased. This was worth to Rs 250 per meter. This material had slight elasticity and drape suitable for a party wear. Satin is a weave that typically contains a glossy surface and a dull back, primarily used in bridal wear. Twinkle is a more diverse and unique version that possesses a sparkly, shiny face and a firm body. Lighter in weight than a traditional satin, it's the perfect choice for wedding decorations including overlays and chair sashes. Other uses include costume and party wear (https://berensteintextiles.com/acatalog/twinkle-sparkle-satin.html)

3.4 Pattern Making and Construction

The pattern making and garment construction steps involved in are explained under the following heads

The bodice part was prepared with princess line. The princess line" or "princess dress" describes a woman's fitted dress or other garment cut in long panels without a horizontal join or separation at the waist. Instead of relying on darts to shape the garment, the fit is achieved with long seams ("princess seams") and shaped pattern pieces. A rarely used alternative name for the Princess line was French-dart-line dress (Delamore and Philip et, al 2005). So the princess line blouse was selected to prepare the garment. A paneled skirt is a very versatile type of skirt. By choosing more or fewer panels and widening or narrowing those panels toward the bottom, you can make a skirt that is almost straight or an incredibly twirly full skirt. The pants are very comfortable to wear, the fronts are kept plain and darts are taken at the back. Waist belt is attached. The opening is kept either at the center front.

The Top piece of the garment included the standardized measurement for the blouse was taken from Mary Mathews (1985) Bust-82cm, Waist-66cm, Back width-38cm,Armscye depth-19cm ,Distance between bust points-18cm and Lower arm-26cm

The Skirt part of the garment included the standardized measurement for the blouse was taken from Mary Mathews (1985) Casing width-4 cm , Waist-64 cm and Full length -96 cm

The Ladies pant of the garment included the standardized measurement for the blouse was taken from Mary Mathews (1985) Full length-102cm, Inside leg-74 cm , Waist-68cm, Seat-92cm, Bottom-46 cm and Belt width-4 cm

3.4b Pattern Drafting

The instruction followed for drafting was an for top piece of garment given below. The drafting was followed from zarapkar (2011)

- **Top Piece of garment**

1-0 One eight chest plus 6.5cm , 2-0 Full length, 3-0 One-twelfth chest plus 1cm, 4-0 One eight chest,shape neck 4-3, 5-0 Shoulder plus 1cm, Square down from 5-6, 7-5 2cm, Join 3-7, 8-6 2.5c m , 9-1 one fourth chest plus 4cm, Shape scye 7-8-9, Square down from 9-10, 11-10 2cm, Join 9-11, 12-11, 13-2 2cm , Shape bottom 13-12, 14-13 one twelfth chest plus 1cm , 15-9 and 16-1 5cm each. Back-17-0 6.5cm, Shape neck 17-3, Keep 2cm outside 11-9 (of back)and 12-9 (of front) for inlays **(Plate-9)**

- **Skirt part of garment**

Fold the material twice making four layers square lines from 0, with folds at 0-1 &1-3. 1-0-Full length less casing with plus about 5 cm for seams at the waist & in turns at the bottom., 2-0 Half waist +10 cm or to taste, 3-1 Same as 2-0 , join 2-3, 4-0-1/12 waist + 2 cm, 5 mid way 2 to 4, 6-1-Same as 5 to 4., Join 4 to 6, 7-6 1.5cm shape 1-7, 8-6 twice 4-0 , Join 2-8, 9-4 and 10-2 1.5 cm each , Shape 9-5 and 10-5 , Cut on lines 4-6 and 8-10 to get six pieces. casing -length- 0-2 and 1-3-waist+ 10 to 12.5cm**,** width- 0-1 and 2-3-about 10 cm **(Plate-10)**

- **Ladies Pant**

Square lines from 0. 1-0 full length less belt-width plus 1 cm (%). , 2-1 inside leg plus 1 cm , 3-2 half 2 to 1 less 5 cm , Square out from 2, 3 and 1, 4.2 one-fourth seat plus 1.5 cm , Square up from 4 to 5, 5-4 Same as 0 to 2, 6-4-2 cm Join 5-6 , 7-6- one-sixth seat, 8.6 one-twelfth seat less 1.5 , 9-6-half 8 to 6, Shape fork 7.9.8, 10-5= one-fourth waist plus 4 to5 cm

for pleat, plus 1.5 cm for seams, 11-5 one-twelfth seat, 12-11 4 to 5 cm for pleat, 13 is midway 11 to 12, 14-4 one-twelfth seat, Square out from 14 to 15, 16-4 one-twelfth seat, Square down from 16 to 17-18, 21-18 and 22-18 each one fourth bottom, 23-8-2 cm , Join 23-21, Shape 8-19.20-17 same as 19 to 17, Join 20-22. Shape sideseam, 10-15-20, neglecting point 2. Back-27-8-5 cm , 28-19 and 29-21 = each 1,5 cm, Shape 27-28, Join 28 19, 30-28 same as 8 to 19, 31 is midway 8 to 6. 32-4 one-fourth waist plus 4 cm., Join 31-32 and produce to 33-34, 34-33-3.25 to 4 cm Shape fork 34-35-30, 36-34 one-fourth waist plus 5 cm, Divide 36-34 into three equal parts and take darts, 2 cm (4) wide and 12.5 to 14 cm (5 to 52) long, at 37 and 38, 41-15, 42-20 and 43-22 = each 1.5 cm, Shape side seam 36-41-42-43 **(Plate-11)**

3.4c Pattern layout

Trial layouts were made by keeping the paper patterns 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 (Singharia, 2013).

Seam allowances width varies with the type of garment. Basic seams namely side seam, style seams 1 to 1.5 cm, enclosed seams, for yoke cuffs - 0.5 cm depth and decorative seams usually require more seam allowance and no seam allowance is required on the fold line. It is important that seam allowances added to the pattern are accurate and clearly marked (Thiravirajan, 2014).

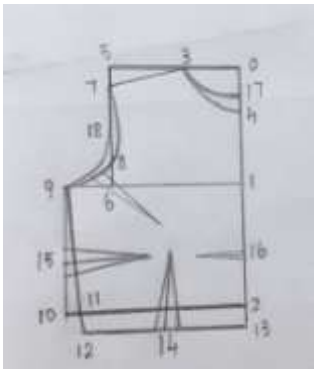
Accordingly, the patterns were placed on the fabric in a most economical way. Adequate seam allowances were left for each piece of the fabric. Enough material was left for cutting yoke, facings and pipings.

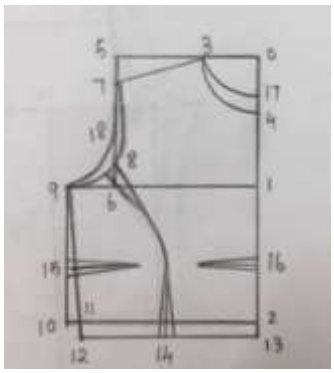
The drafted and altered patterns were transferred to the fabrics using different tools namely tailors, chalk and tracing wheel suitable for various materials. After transferring the fabrics were cut accordingly with seam allowances (Hurkman, 2013).

In top piece of garment double fold layout was used in this type of layout the fabric was folded at all, the pattern pieces were laid in such a way that the fabric was not wasted. Thus the top piece of the garment was laid for cutting **(Plate-12)**

In Skirt part of the garment double fold layout method was used and, the pattern pieces were laid in such a way that the fabric was not wasted. To prepare the skirt part of the garment. Thus the skirt part of the garment was laid for cutting **(Plate-13)**

In Ladies Pant double fold layout method was used and , the pattern pieces were laid in such a way that the fabric was not wasted. To prepare the ladies pant of the garment. Thus the ladies pant of the garment was laid for cutting **(Plate-14)**





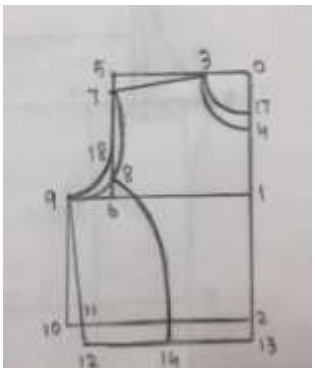
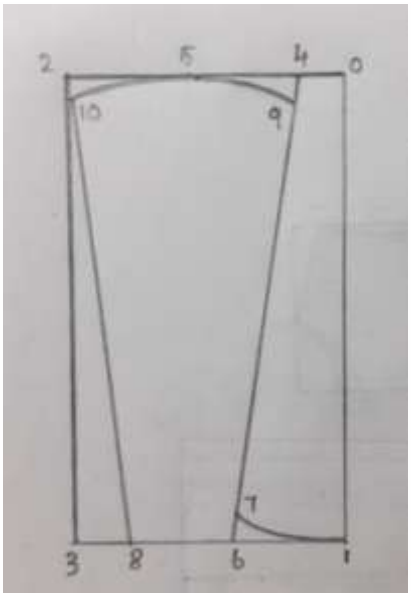


Plate: 9a Top piece of garment **Plate: 9b Pivot method** **Plate: 9c Princess line Top**

Plate-9 Draft of Bodice part



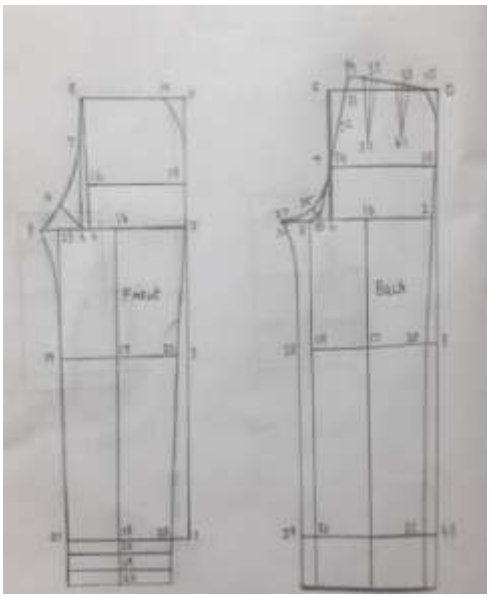


Plate: 10 Skirt Part of the garment **Plate: 11 Ladies Pant**

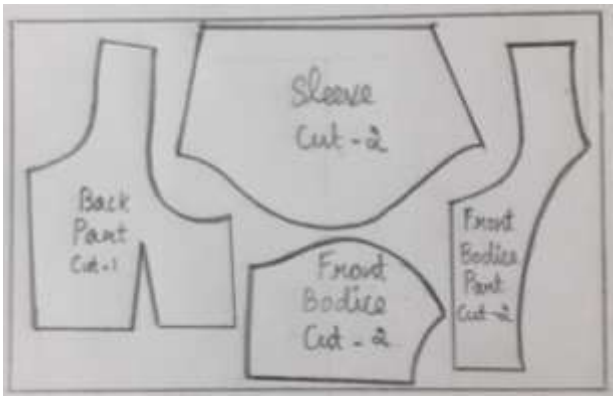


Plate -12 Top Piece of the garment

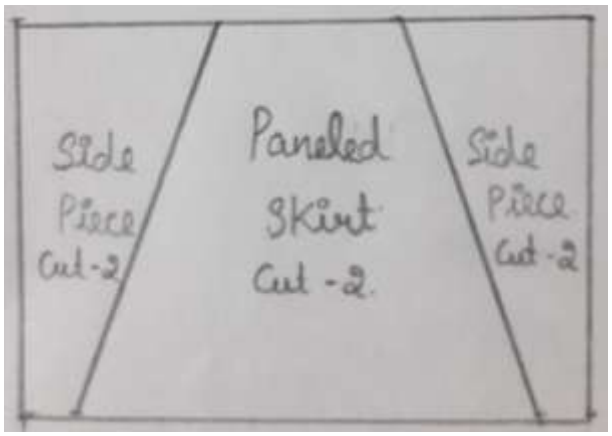


Plate- 13 Skirt part of the garment

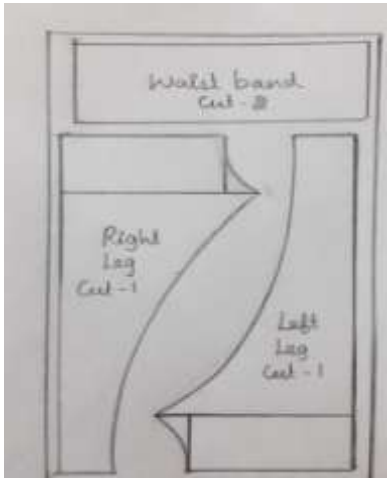


Plate- 14 Ladies pant

3.4d Construction Method

The garment construction was carried out as explained under

Top piece of the garment

- The 1st and 2nd piece were placed by facing right sides together and sewn along the curved line of center piece
- Shoulder of front and back parts were attached
- Sleeve have to be added. The hemline of sleeves is finished and both the sleeves are attached to the bodice.
- Now attach the side seams using 2cm seam allowance, The hemlines are finished
- The neck line is finished with bias piece
- The placket opening is finished with hooks

Skirt part of the garment

- The centre front piece is joined with side pieces on both the sides for front part.
- The centre back piece was joined with side pieces at both sides for back part
- Side seam on left side, was joined
- Placket opening about 4" at right side, was finished
- Side seams were finished
- waist band was attached hem line was finished
- Casing was inserted at the waist line.

Ladies Pants

- The fabric was laid flat on the table surface. The pattern pieces were placed on top so that they are not touching and pinned down to the fabric, which will make it easier to mark and cut without the pieces moving. Tailors chalk was used to mark the pattern edges. Fabric was cut along the outline of pattern for front and back pieces
- The pattern from the front and back leg fabric pieces. keeping the left and right separate the leg pieces up inside out so that their long outer edges align to set up the

side seams. Using sewing machine it was sewn leaving half-inch seam allowance. The inner leg seams until crotch area. The left and right legs were finished

- The zigzag stitches were given for extra reinforcement.
- The bottom of each leg was folded under, following the pattern instructions. Measuring tape was used to make the two sides even, and pressed to remove the crease. The bottom was folded such that the raw edges are not seen then the hem is finished using straight stitches.
- The pieces of waistband are sewn together to create a loop. Half is folded and press with iron, then pants are flipped inside out. The waistband is sewn casing onto the top of your pair of pants, leaving a small opening on one side so that you can slide it in later
- Elastic was cut as required for waistband. It is fed through the opening in the waistband until it comes out the other side. Two ends of the elastic are sewn together to make one smooth elastic loop. The opening in sewn to finish the waist band.

Thus the three different types of garments namely Traditional wear, Indo western wear and western wear constructed. The traditional wear(G1) prepared comprised of the bodice, skirt and shawl where as the Indo western garment (G2) comprised of bodice, pants and the shawl. The western type garment (G3) comprised of bodice skirt and shawl. This cost of the garment were also displayed along with photos for evaluation. **(Plate- 15, 16, 17)**

3.10 Constructed Garment G1, G2 and G3

Plate- 15 (G1)

Plate- 16 (G2)

Plate- 17 (G3)

3.5 Appearance study

The appearance of the sketches prepared using CAD and the constructed garments which were evaluated by panel of judges, numbering hundred members

3.5a Computer Designed Garment

The computer designed garment pictures were displayed for assessment by a panel of judges numbering 100. The design were on traditional wear (1a-1d), Indo western wear (2a-2d) and western wear (3a-3d). The Proforma prepared for conducting the appearance study comprised of various aspects namely visual principles, occasion for which 1 garment was planned and the overall appearance, sketched garment liker scale (5) was used for assessing the sketches **(Appendix-1)**

The data obtained from the judgement of the panel was recorded and tabulated this was then statistically analyzed

3.5b Constructed Garment

The prepared garment based on Traditional wear, Indo western wear and Western wear were put on over a dummy and the photos were taken These photos were coded and the placed for judgement by a panel 100 members. The profoma used for assessing the multiwear garment comprised of aspects namely design , colour selection, material selection and cost Also the visual principles namely harmony, rhythm, emphasis, balance, proportion which are basic principles design were also assessed for The data obtained were garment recorded all the obtained data were recorded and tabulated this was then statistically analyzed.

3.5c Cost Estimation

The cost of the prepared multiwear garment was analyzed, calculated, recorded and this was tabulated. The details of cost estimation made for the garment are presented in Table-I

Table: 1
Cost Estimation

Particulars	G1	G2	G3
Material (Main)	752	668	752
Material (Lining)	450	400	450
Stitching	200	200	200
Cost price	1402	1268	1402
Profit (20%)	302	168	302
Selling Price	1702	1436	1702

Thus the Table- I shows that the garment G1 and G3 were Rs 1702/-, G2 was Rs 1436/-.This involved the material costs, stitching costs and profit of 20%

3.6 Statistical Analyses

Analysis of variance (ANOVA) is a collection of statistical models and their associated estimation procedures used to analyze the differences among means. ANOVA was developed by the statistician Ronald Fisher. ANOVA is based on the law of total variance, where the observed variance in a particular variable is partitioned into components attributable to different sources of variation. In its simplest form, ANOVA provides a statistical test of whether two or more population means are equal, and therefore generalizes the t-test beyond two means. In other words, the ANOVA is used to test the difference between two or more means. (kyum, 2017)

The statistical analyses using ANOVA was done for the data obtained the garments and the characteristic feature of the sketches of garment.

4. RESULTS AND DISCUSSION

The Result and Discussion are explained under the following heads

4.1 Assessment of Computer Aided Designed Sketches

The assessment result for computer aided designed sketches are presented under the following heads.

4.1a Visual Principles

The principles of design namely Harmony, Rhthym, Emphasis, Balance, Proportion were analysed visually and the data obtained are presented in Table- II (Fig-1)

Table II
Visual Principles

Design Code	Visual Principles (%) (Harmony,Rhythm,Emphasis,Balance,Proportion)				
	Very high	Moderatelyhigh	High	ModeratelyLow	Very Low
1a	23	41	27	9	-
1b	21	39	34	6	-
1c	24	35	25	11	5
1d	28	40	21	11	-
2a	26	37	26	10	1
2b	28	36	28	7	1
2c	36	39	21	4	-
2d	37	39	20	4	-
3a	30	33	23	11	1
3b	30	37	22	10	1
3c	28	44	25	2	1
3d	34	45	20	1	-

From Table-II it is clear that the maximum of 28 percent of judges rated the sketch 1d as very high as for the visual principles followed by the sketches 1c, 1a and 1b with 24, 23

and 21 percentages of judges respectively. Hence could be concluded that the maximum rating was for sketch 1d visual principles

Among the sketches of indo western wear the maximum of 31 percent of judges rated the sketch 2d to have very high visual concepts used in sketching. This was followed by 2c, 2b and 2a with 36, 28 and 26 percentages of judges respectively. Hence could be concluded that the maximum rating was for sketch 2d visual principles

Among the Sketches of western wear the maximum of 34 percent of Judges rated the sketch 3d to have very high visual concepts used in sketching. This was followed by 3a,3b and 3c with 30,30 and 28 percentages of Judges respectively. Hence could be concluded that the maximum rating was for Sketch 3d visual principles

4.1b Suitability for occasions

The suitability of the garments for two different occasions namely Party wear and Casual wear from the displayed sketches were recorded and tabulated this Table is presented in below (Fig-2)

Table III suitability for Occasions

Design code	Occasion (%)	
	Party Wear	CausalWear
1a	49	51
1b	66	34
1c	52	47
1d	47	53
2a	51	49
2b	70	30
2c	72	28
2d	60	40
3a	52	48
3b	56	44
3c	49	51

3d	53	47

- **Party Wear**

From the Table III it is clear that the maximum 66 percent of Judges expressed that the. Sketch 1b could be used for party wear followed by sketches. 1c, 1a, id with 52, 49 and 47 percentages of Judges respectively. Hence could be concluded that the maximum rating was for sketch 1b party wear.

The maximum of 72 percent of Judges expressed that the sketch 2c could be used for party wear followed by sketches 2b, 2d and 2a with 70, 60 and 51 percentages of judges respectively. Hence could be concluded that the maximum rating was for sketch 2c party wear.

The maximum of 56 percent of Judges expressed that the sketch 3b could be used for party wear followed by sketches 3d, 3a, 3C with 53, 52 and 49 percentages of Judges respectively. Hence could be concluded that the maximum rating was for sketch 3b party wear

- **Casual Wear**

The maximum of 53 percent of Judges expressed that the sketch 1d could be used for Casual wear followed by sketches. 1a, 1c and 1b with 51, 47 and 34 percentages of Judges respectively. Hence could be concluded that the maximum rating was for sketch 1d casual wear.

Among the Sketches the maximum of 49 percent of Judges expressed that the sketch 2a could be used for casual wear followed by sketches 2d, 2b and 2c with 40, 30 and 28 percentages of Judges respectively. Hence Could be concluded that the maximum rating was for sketch 2a casual wear.

The maximum of 51 percent of Judges expressed that the Sketch 3C could be used for casual wear followed by sketches 3a, 3d and 3b with 48, 47 and 44 percentages of Judges respectively. Hence could be Concluded that the maximum rating was for sketch 3c casual wear.

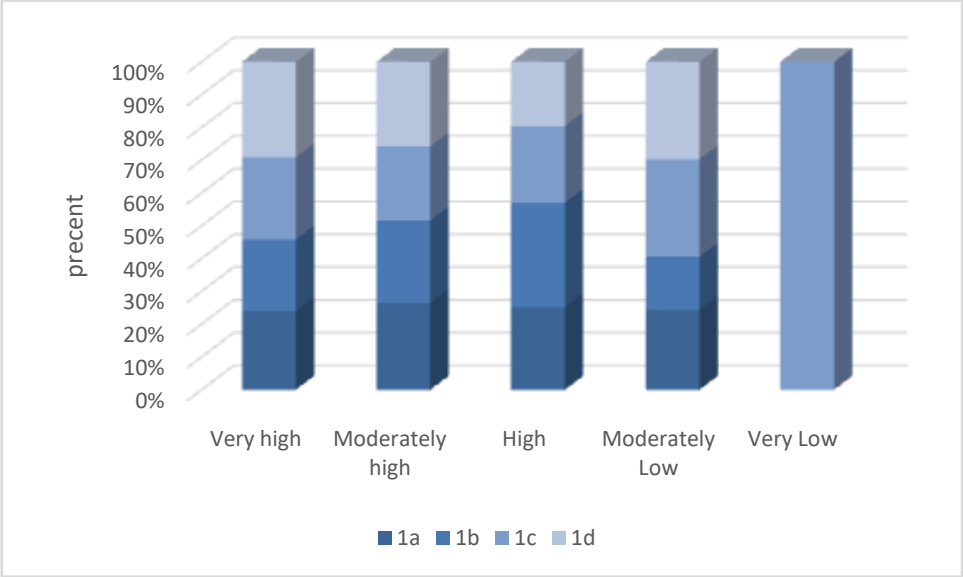


Figure: 1

Visual Principles (Harmony, Rhythm, Emphasis, Balance, Proportion)

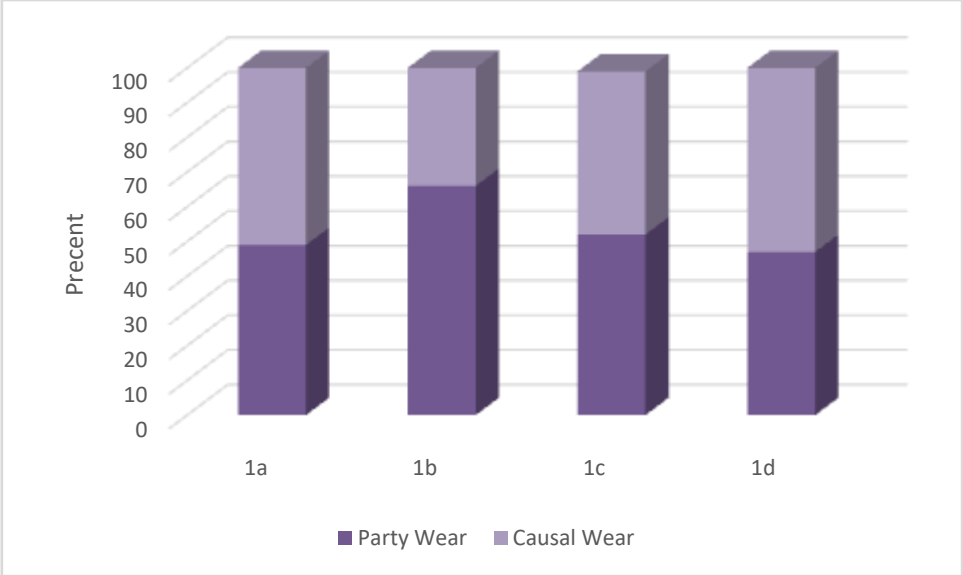


Figure: 2

Occasion

4.1c Overall appearance

The overall appearance of the garment from the displayed sketches were recorded and tabulated this Table is presented in below (Fig-3)

Table – IV overall appearance

Design Code	Overall Appearance (%)				
	Excellent	**Very Good**	**Good**	**Fair**	**Poor**
1a	19	23	16	23	19
1b	29	30	24	11	6
1c	31	33	26	9	1
1d	33	36	30	1	-
2a	22	32	36	10	-
2b	31	36	21	10	2
2c	32	36	28	4	-
2d	34	33	32	1	-
3a	30	32	29	9	-
3b	28	32	27	11	2
3c	30	33	26	10	1
3d	35	34	30	1	-

From the Table - IV it is clear that The maximum of 33 percent of Judges rated the Sketch 1d as excellent as for the over all appearance followed by the sketches lc, 1b and la with 31, 29 and 19 percentages of Judges respectively. Hence could be concluded that the maximum rating was for Sketch 1d overall apperanace

Among the sketches of Indo western wear the maximum of 34 percent of Judges rated the sketch 2d as excellent as for the oven all appearance followed by the sketches 2c, 2b and 2a with 32,31 and 22 percentages of Judges respectively. Hence could be concluded that the maxim rating was for sketch 2d overall appearance

The maximum of 35 percent of Judges rated the sketch 3d as excellent as for the over all appearance followed by the Sketches 3a, 3c and 3b with 30,30 and 28 percentages of Judges respectively. Hence could be concluded that the maximum rating was for sketch 3d overall appearance

The Sketches 1d 2d and 3d Carried out using CAD were selected for further study as this designs obtained highest ratings in traditional, Indo western, and western wear respectively for their appropriate visual principles namely Harmony, Rthym, emphasis, proportion selected in the designs. Further this designs were rated as excellent for over all appearance

4.1d Design

The design of the garment from the displayed Photos were recorded and tabulated this Table is presented in below Table –V (Fig-4)

Table- V Design of the garment

Garment code	Design (%)			
	Very Good	Good	Fair	poor
G1	62	26	12	-
G2	38	51	10	1
G3	72	18	8	2

From the Table V it is clear that the maximum of 72 percent of Judges rated the garment G3 as very good as for the design followed by the garments G1 and G2 with 62 and 28 percentages of Judges respectively. Hence could be. concluded that the maximum ratting was for garment G3 design.

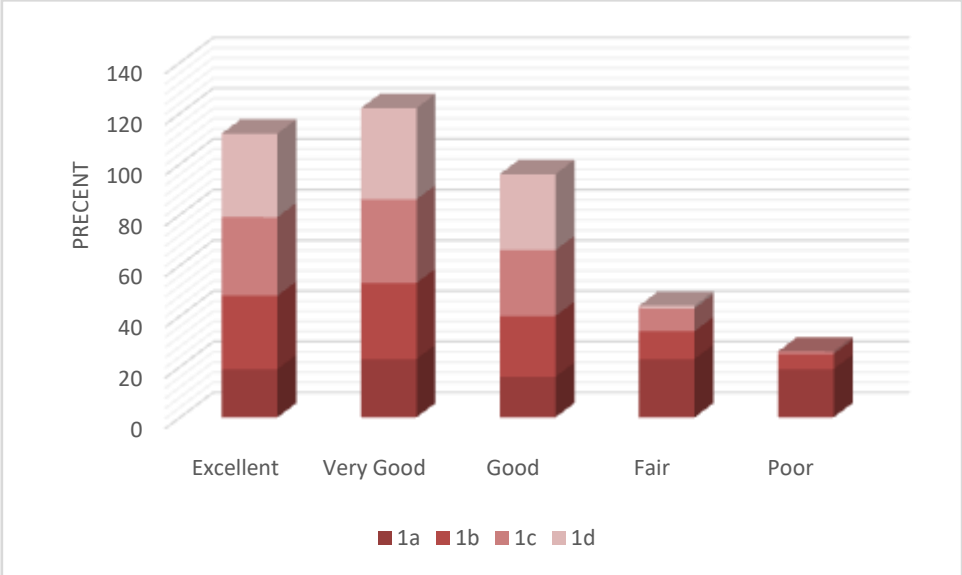


Figure: 3

Overall Appearance

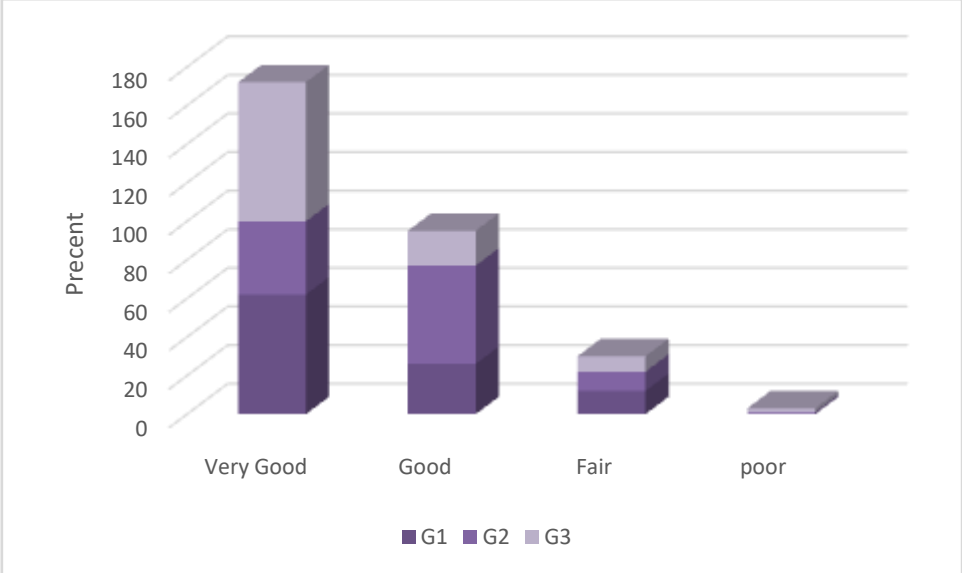


Figure: 4

Design

4.1e Colour Selection

The colour selection of the garment from the displayed photos were recorded and tabulated this table is presented in below Table- VI (Fig-5)

Table-VI Colour Selection

Design	Colour Selection (%)			
	Very Good	Good	Fair	poor
G1	56	35	5	4
G2	49	42	5	4
G3	61	28	7	4

From the Table -VI it is clear that the maximum of 61 percent of Judges rated the garment G3 as very good as for the design followed by the garments G1 and G2 with 56 and 49 percentages of Judges respectively. Hence could be concluded that the maximum rating was for garment G3 colour selection.

4.1f Material selection

The Material selection of the garment from the displayed photos were recorded and tabulated this Table is presented in below Table- VII (Fig-6)

Table- VII Material Selection

Design	Material Selection (%)			
	Very Good	Good	Fair	poor
G1	53	36	11	-
G2	41	49	10	-
G3	51	36	11	2

From the table VII it is clear that the maximum of 51 percent of Judges rated the garment G3 as very good as for the design followed by the garment G1 and G2 with 53 and

41 percentages of Judges respectively. Hence could be concluded that the maximum rating was for garment G3 material selection.

Figure: 5

Colour selection

Figure: 6

Material selection

4.1g Visual Principles

The principles of design namely Harmony, Rhythm Emphasis, Balance, proportion were analyzed visually and the data obtained are presented in table-VIII (Fig-7)

Table-VIII Visual Principles

S:No	Design	Visual Principles (%)														
		Harmony			Rhythm			Emphasis			Balance			Proportion		
		Very Good	Good	Poor	Very Good	Good	Poor	Very Good	Good	Poor	Very Good	Good	Poor	Very Good	Good	Poor
1	G1	39	58	3	57	42	1	54	44	2	58	41	1	57	42	1
2	G2	38	60	2	50	48	2	41	56	3	44	53	3	47	53	-
3	G3	48	50	2	56	42	2	50	49	1	55	42	35	55	42	3

From Table VIII it is clear that the maximum of 60 Percent of Judges rated the garment G2 as Good as for the visual principles followed by the garment G1 and G2 with 58 and 50 percentages of Judges respectively. Hence could be concluded that the maximum rating was for garment G2 visual principles.

4.1i Cost

The Cost of the garment from the displayed Photos were recorded and tabulated this table is Presented in below Table – IX (Fig-8)

Table- IX Cost

Design	Cost (%)			
	High	Very High	Low	Very Low
G1	49	21	30	-
G2	34	36	30	-
G3	47	19	32	2

From Table – IX it is clear that the maximum of 49 Percent of Judges rated the garment G1 as high as for the cost followed by the garment G2 and G3 with 41 and 34 percentages of Judges respectively Hence could be concluded that the maximum rating was for garment G1 for high cost and G3 for low cost

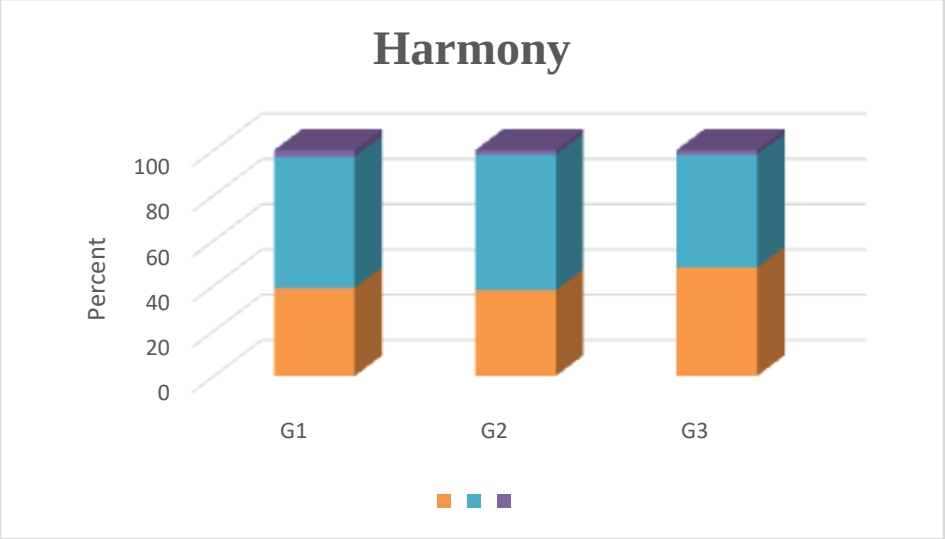


Figure: 7

Visual principles

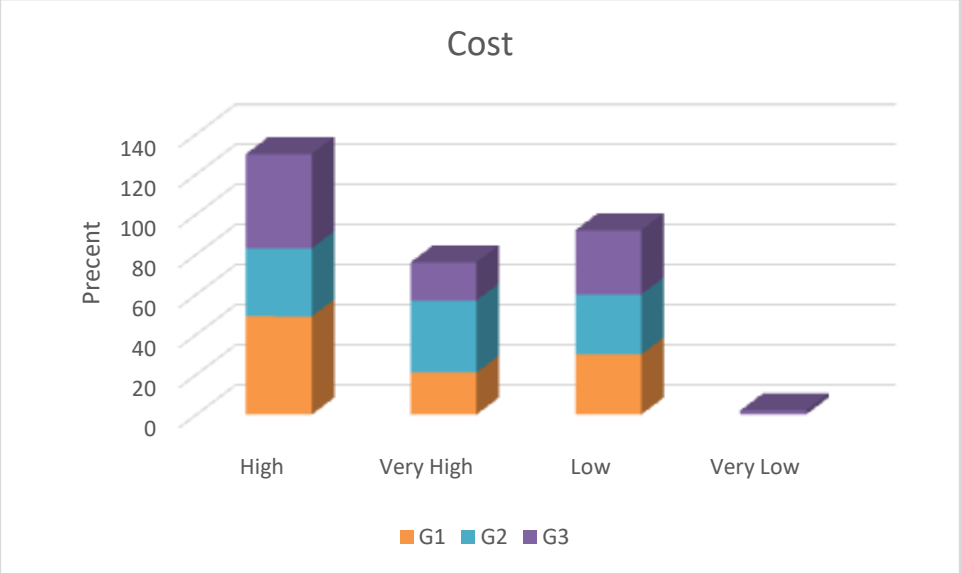


Figure-8

Cost

4.2 ANOVA

The statistical analyse prepared by the following head

4.2a ANOVA Between Attributes of Sketches

The statistical analysis carried out for the data between attributes of sketches

Table- X

Variable		Mean	SD	SE	F-value	.Sig
1a	Visual Principles	3.78	0.91	0.09	129.896	.000*
	Occasion	1.51	0.50	0.05		
	Over all Appearance	3.00	1.41	0.14		
1b	Visual Principles	3.76	0.87	0.09	307.486	.000*
	Occasion	1.36	0.54	0.05		
	Over all Appearance	3.92	0.98	0.10		
1c	Visual Principles	3.72	1.10	0.11	216.491	.000*
	Occasion	1.47	0.50	0.05		
	Over all Appearance	3.84	1.00	0.10		
1d	Visual Principles	3.01	1.42	0.08	230.313	.000*
	Occasion	3.77	0.93	0.09		
	Over all Appearance	1.48	0.50	0.05		
2a	Visual Principles	3.66	1.03	0.10	229.605	.000*
	Occasion	3.72	0.98	0.10		
	Over all Appearance	1.49	0.50	0.05		
2b	Visual Principles	3.65	0.95	0.09	305.238	.000*
	Occasion	3.87	0.92	0.09		
	Over all Appearance	1.30	0.46	0.05		
2c	Visual Principles	3.84	1.04	0.10	447.146	.000*
	Occasion	4.07	0.86	0.09		
	Over all Appearance	1.28	0.45	0.05		
2d	Visual Principles	4.04	0.89	0.09	338.654	.000*
	Occasion	4.02	0.93	0.09		

	Over all Appearance	1.40	0.49	0.05		
3a	Visual Principles	3.88	0.90	0.09	247.509	.000*
	Occasion	3.86	1.04	0.10		
	Over all Appearance	1.48	0.50	0.05		
3b	Visual Principles	3.80	0.94	0.09	309.228	.000*
	Occasion	4.03	0.81	0.08		
	Over all Appearance	1.44	0.50	0.05		
3c	Visual Principles	3.86	1.06	0.11	311.180	.000*
	Occasion	3.96	0.84	0.08		
	Over all Appearance	1.41	0.49	0.05		
3d	Visual Principles	3.81	1.01	0.10	202.342	.000*
	Occasion	3.76	1.00	0.10		
	Over all Appearance	1.53	0.50	0.05		

*= Significant at 1% level, **= Significant at 5% level

The above tables shows the output of One-way ANOVA analysis, it shows that there is a statistical significant difference between attributes like visual Principles, occasion and over all appearance at 1% level with different samples like G1 (1a, 1b, 1c and 1d), G2 (2a, 2b, 2c and 2d) and G3 (3a, 3b, 3c and 3d). From mean it is shown that, 1d, 2a, 2b, 2c, 3b and 3c sample have highteght mean valuefor occasion, visual principles are good 1a, 2d, 3a and 3d and 1b and 1c have over all appearance. Thus, the result shows that occurrence is good in samples selected and all the samples made were purely accepted by the respondents as they are satisfied with all the attributes.

4.2b ANOVA between Garment G1, G2 and G3

The statistical analysis carried out for the data between Garment G1, G2 and G3

Table- XI

Variable		Mean	SD	SE	F-value	.Sig
Visual Principles 1	G1	3.78	0.91	0.09	.517	$.597^{NS}$
	G2	3.72	0.98	0.10		
	G3	3.86	1.04	0.10		
Visual	G1	3.76	0.87	0.09	2.461	$.087^{NS}$

Principles 2	G2	3.87	0.92	0.09		
	G3	4.03	0.81	0.08		
Visual Principles 3	G1	3.72	1.10	0.11	3.624	.028**
	G2	4.07	0.86	0.09		
	G3	3.96	0.84	0.08		
Visual Principles 4	G1	3.77	0.93	0.09	2.388	$.094^{NS}$
	G2	4.02	0.93	0.09		
	G3	3.76	1.00	0.10		
Occasion 1	G1	1.51	0.50	0.05	.092	$.912^{NS}$
	G2	1.49	0.50	0.05		
	G3	1.48	0.50	0.05		
Occasion 2	G1	1.36	0.54	0.05	1.962	$.142^{NS}$
	G2	1.30	0.46	0.05		
	G3	1.44	0.50	0.05		
Occasion 3	G1	1.47	0.50	0.05	4.045	.018**
	G2	1.28	0.45	0.05		
	G3	1.41	0.49	0.05		
Occasion 4	G1	1.48	0.50	0.05	1.729	$.179^{NS}$
	G2	1.40	0.49	0.05		
	G3	1.53	0.50	0.05		
Over all Appearance 1	G1	3.00	1.41	0.14	14.332	.000*
	G2	3.65	0.95	0.09		
	G3	3.80	0.94	0.09		
Over all Appearance 2	G1	3.92	0.98	0.10	.164	$.849^{NS}$
	G2	3.84	1.04	0.10		
	G3	3.86	1.06	0.11		
Over all Appearance 3	G1	3.84	1.00	0.10	1.666	$.191^{NS}$
	G2	4.04	0.89	0.09		
	G3	3.81	1.01	0.10		
Over all Appearance 4	G1	3.66	1.03	0.10	1.709	$.183^{NS}$
	G2	3.88	0.90	0.09		
	G3	3.65	1.05	0.10		

*= Significant at 1% level, **= Significant at 5% level

The above tables shows the output of One-way ANOVA analysis, it shows that there is a statistical significant difference between attributes like overall appearance 1 (1% level), with different samples like G1, G2 and G3, there is a 5% statistical significant difference between visual principles 3 and occasion 3 samples like G1, G2 and G3 and there is no statistical difference between visual principles 1, visual principles 2, visual principles 4, occasion 1, occasion 2, occasions 4, over all appearance 2, over all appearance 3 and over all appearance 4 with in-between samples selected (G1, G2 and G3). From mean it is shown that, occasion 1, occasion 2 and over all acceptance 2 is good in sample G1, visual principles 3, visual principles 4, over all appearance 3 and over all appearance 4 is good in sample G2 and visual principles 1, visual principles 2, occasions 2, occasions 4 and over all appearance 1 is good in G3. Thus, the result shows that G2 and G3 is the best sample.

4.2c ANOVA Between Attributes of Each Garment

The statistical analysis carried out for the data between Attributes of each garment

Table- XII

Variable		Mean	SD	SE	F-value	.Sig
G1	Design	3.50	0.70	0.07	53.753	.000*
	Color Selection	3.43	0.77	0.08		
	Material Selection	3.42	0.68	0.07		
	Cost	3.19	0.87	0.09		
	Harmony	2.36	0.54	0.05		
	Rhythm	2.56	0.52	0.05		
	Emphasis	2.52	0.54	0.05		
	Balance	2.57	0.52	0.05		
	Proportion	2.56	0.52	0.05		
G2	Design	3.26	0.68	0.07	50.364	.000*
	Color Selection	3.36	0.76	0.08		
	Material Selection	3.31	0.65	0.06		
	Cost	3.04	0.80	0.08		

	Harmony	2.36	0.52	0.05		
	Rhythm	2.48	0.54	0.05		
	Emphasis	2.38	0.55	0.05		
	Balance	2.41	0.55	0.06		
	Proportion	2.47	0.50	0.05		
G3	Design	3.60	0.72	0.07	50.671	.000*
	Color Selection	3.46	0.80	0.08		
	Material Selection	3.36	0.76	0.08		
	Cost	3.11	0.93	0.09		
	Harmony	2.46	0.54	0.05		
	Rhythm	2.54	0.54	0.05		
	Emphasis	2.49	0.52	0.05		
	Balance	2.52	0.56	0.06		
	Proportion	2.52	0.56	0.06		

*= Significant at 1% level, **= Significant at 5% level

The above tables shows the output of One-way ANOVA analysis, it shows that there is a statistical significant difference between attributes like Design, Color Selection, Material Selection, Cost, Harmony, Rhythm, Emphasis, Balance, Proportion (1% level) with different samples like G1, G2 and G3. From mean it is shown that, the garment G1and G3 have gooddesign, G2 have good color selection. Thus, the result shows that design and color selection is good in samples selected and all the samples made were purely accepted by the respondents as they are satisfied with all the attributes.

4.2 b ANOVA Between Garment G1, G2 and G3

The statistical analysis carried out for the data between Garment G1, G2 and G3

Table- XIII

Variable		Mean	SD	SE	F-value	.Sig
Design	G1	3.50	0.70	0.07	6.201	.002*
	G2	3.26	0.68	0.07		

	G3	3.60	0.72	0.07		
Color Selection	G1	3.45	0.71	0.04	.438	.645^{NS}
	G2	3.43	0.77	0.08		
	G3	3.36	0.76	0.08		
Material Selection	G1	3.46	0.80	0.08	.622	.537^{NS}
	G2	3.42	0.77	0.04		
	G3	3.42	0.68	0.07		
Cost	G1	3.31	0.65	0.06	.744	.476^{NS}
	G2	3.36	0.76	0.08		
	G3	3.36	0.70	0.04		
Harmony	G1	3.19	0.87	0.09	1.166	.313^{NS}
	G2	3.04	0.80	0.08		
	G3	3.11	0.93	0.09		
Rhythm	G1	3.11	0.87	0.05	.610	.544^{NS}
	G2	2.36	0.54	0.05		
	G3	2.36	0.52	0.05		
Emphasis	G1	2.46	0.54	0.05	1.887	.153^{NS}
	G2	2.39	0.54	0.03		
	G3	2.56	0.52	0.05		
Balance	G1	2.48	0.54	0.05	2.270	.105^{NS}
	G2	2.54	0.54	0.05		
	G3	2.53	0.53	0.03		
Proportion	G1	2.52	0.54	0.05	.732	.482^{NS}
	G2	2.38	0.55	0.05		
	G3	2.49	0.52	0.05		

*= Significant at 1% level, **= Significant at 5% level

The above tables shows the output of One-way ANOVA analysis, it shows that there is a statistical significant difference between attributes like Design (1% level), with different samples like G1, G2 and G3, and there is no statistical difference between Color selection, material selection, cost, harmony, rhythm, balance and proportion with in-between samples selected (G1, G2 and G3). Other products have more suitability, cost benefit, comfort and decorative items have more visual principles. From mean it is shown that, Design, Color selection, material selection, harmony, proportion is good in sample G1, cost, rhythm and

balance is good in sample G2 and emphasis is good in sample G3. Thus, the result shows that G1 is the best sample

5. SUMMARY AND CONCLUSION

Introduction

Multifunctional clothing is a way to make clothes that can be used in different situations or scenarios. The assembling or disassembling features are the systems to provide total comfort to the wearer in making their own choices of functions (Crawford, 2006).

The value of multifunctional clothing is determined by the technical aspects of the product. The clothing does not just have a single product design but also series of different functions that can even be practical across several seasons and create a unique production marketing chain. It consists of three main features, namely diversity, flexibility, and continuity (Li, Chen & Wang, 2018).

Considering the above facts, the study entitled **"DESIGN AND DEVELOPMENT OF MULTIWEAR GARMENT FOR ADOLESCENT"** was carried out with the following objectives

Objectives

- Selection of theme of inspiration
- Construction of theme based multiwear garment
- Estimation of cost of garment
- Analysis of the prepared garment

Methodology

- The theme selected for the study was galaxy. The theme inspired was galaxy for its colour and luster in it and with the idea to prepare party wear garment, this was selected.
- The boards prepared based on the theme the galaxy were mood board, story board, colour board, texture board, accessory board, customer profile flat sketches and final presentation.
- Thus the mood board was prepared to expressing the concept of inspiration

- Thus the story board was prepared expressing the story of the whole concept in poetic form along with the related pictures
- The colour board was prepared based on the mood board to exhibit the inspired colours in the palette the feeling of the galaxy was well brought in the board through appropriate inspired colour
- The texture board was prepared after sourcing the material. The texture which has been planned for garment making was exhibited in this board
- The accessory board expresses the probable accessories which could be used along with the garment for obtaining a completion in the costume. When it comes to reality
- The customer profile was prepared to express various aspects such as age, gender, location, occupation, height, weight, occasions, income level and taste of the customer.
- The flat sketches were prepared comprising of four sketches for each selected designs. The designs were for traditional wear, indo western wear and western wear.
- Thus about 12 sketches for 3different designs were prepared
- The final presentation board expresses the complete garment with suitable accessories on 9-head croqui. This gives the final appearance of each garment carried out for traditional wear, Indo western wear and Western wear this also was worked using CAD
- The material suitable for the inspired theme was purchased from CPC in Coimbatore city about six meters with 107 cm (42”) width purchased.
- The standardized measurement for the blouse was considered taken from Mary Mathews
- Thus the three different types of garment namely Traditional wear, Indo western wear and western wear constructed. The traditional wear (G1) prepared comprised of the bodice, skirt and shawl where as the Indo western garment (G2) comprised of bodice, pants and the shawl. The western type garment (G3) comprised of bodice skirt and shawl. This cost of the garment were also displayed along with photos for evaluation.
- The appearance of the sketches prepared using CAD and the constructed garments which were evaluated by panel of judges.
- The computer designed garment pictures were displayed for assessment by a panel of judges numbering 100. The design were on traditional wear (1a-1d), Indo western wear (2a-2d) and western wear

- The Proforma prepared for conducting the appearance study comprised of various aspects namely visual principles, occasion for which 1 garment was planned and the overall appearance, sketched garment liker scale (5) was used for assessing the sketches
- The data obtained from the judgement of the panel was recorded and tabulated this was then statistically analyzed
- The prepared garment based on Traditional wear, Indo western wear and Western wear were put on over a dummy and the photos were taken These photos were coded and the placed for judgement by a panel 100 members. The profoma used for assessing the multiwear garment comprised of aspects namely design , colour selection, material selection and cost
- Also the visual principles namely harmony, rhythm, emphasis, balance, proportion which are basic principles design were also assessed for The data obtained were garment recorded all the obtained data were recorded and tabulated this was then statistically analyzed.
- The statistical analyses using ANOVA was done for the data obtained the garments and the characteristic feature of the sketches of garment.

Findings of the study

- The maximum rating was for sketch 1d, 2d and 3d as for the visual principles
- The maximum rating was for sketch 1b,2c and 3b were rated high for using it as party wear garment
- The maximum rating was for sketch 1d, 2a and 3c were rated high for using it as casual wear garment
- The maximum rating was for Sketch 1d, 2d and 3d were rated high for using it as overall appearance
- The maximum ratting was for garment G3 design
- The maximum rating was for garment G3 colour selection
- The maximum rating was for garment G3 material selection
- The maximum rating was for garment G2 visual principles
- The maximum rating was for garment G1 for high cost and G3 for low cost

- The sketches that, 1d, 2a, 2b, 2c, 3b and 3c sample have high mean value for occasion, visual principles were good 1a, 2d, 3a and 3d and 1b and 1c have overall appearance.
- Occasion 1, occasion 2 and over all acceptance 2 is good in sample G1, visual principles 3, visual principles 4, overall appearance 3 and over all appearance 4 is good in sample G2 and visual principles 1, visual principles 2, occasions 2, occasions 4 and over all appearance 1 is good in G3. Thus, the result shows that G2 and G3 are good
- The garment G1and G3 have good design, G2 have good color selection. design and color selection is good in samples selected and all the samples made were purely accepted by the respondents as they are satisfied with all the attributes
- Design, Color selection, material selection, harmony, proportion is good in sample G1, cost, rhythm and balance is good in sample G2 and emphasis is good in sample G3. Thus, the result showed that G1 traditional wear is the best garment among others.

Conclusion

The inspired theme Galaxy with the selected material and colours gave a satisfactory appearance for party wear garment in the traditional wear. The cost effective party wear traditional garment gave a good appearance are without any embellishment or accessories. The reason being the glittering self decoration incorporated in material

Recommendation

- Any other theme from nature can be selected as inspiration for designing and development
- The multiwear garment of various other design can be prepared. Trimmings, decoration of other accessories to enhance the beauty of the garment.

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APPENDICES

Appendix- I

Proforma to elicit information for Analysing Suitability & Design Principles

S.No	Design code	Visual Principles (Harmony, Rhythm,Emphasis, Balance, Proportion)					Occassion		Over all Appearance				
		Very high	Moderatelyhigh	High	ModeratelyLow	Very Low	Party Wear	Casual Wear	Excellent	Very Good	good	Fair	Poor
1.	1a												
	1b												
	1c												
	1d												
2.	2a												
	2b												
	2c												
	2d												
3.	3a												
	3b												
	3c												
	3d												

Appendix -II

Proforma To Elicit Information Regarding The Multiwear Garment Through Visual Inspection

S.No	Garment code	Design				Colour Selection				Material Selection				
		Very Good	Good	Fair	poor	Very Good	Good	Fair	poor	Very Good	Good	Fair	poor	
1.	G1													
2.	G2													
3.	G3													

Visual Principles													
Harmony			Rhythm			Emphasis			Balance			Proportion		
Very Good	Good	Poor	Very Good	Good	Poor	Very Good	Good	Poor	Very Good	Good	Poor	Very Good	Good	Poor