CREATING ADJASTABLE AND REVERSIBLE GARMENTS FOR VISUALLY CHALLENGED GRADE SCHOOL GIRLS

By

SOUMYA.T.K

[Reg.No.09PFA14]

A DISSERTATION SUBMITTED TO THE

AVINASHILINGAM DEEMED UNIVERSITY FOR WOMEN

COIMBATORE – 641 043.

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE IN TEXTILES AND FASHION APPAREL

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CERTIFIED AS BONAFIED RESEARCH WORK

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ACKNOWLEDGEMENT

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INTRODUCTION

INTRODUCTION

Disability is any restriction or lack of ability to perform an activity in the manner or within the range consider for human body. Disabilities are mainly classified into five namely seeing, speech, hearing, movement and mental,Shrigavi and Naik (2010). The proportion of disabled in India as per census 2010 is 2.13 percentage of total population. Classification of disabled population by categories of disabilities show that proportion of seeing disabilities are highest disability. Main reasons for visual disability are sore eyes, severe diahorrea, cateract, glaucoma, corneal opacity and other eye diseases. When vision of a person is completely or partially challenged, he has to depend upon his remaining senses of hearing touch, smell and taste can all be used to help him to recognize the position in relation to obstacles and landmarks around in the environment. The visually challenged person can gain a great deal of information by his sense of touch. Touch is essential for concept of clarity and determination of nature of object, texture, resilience, temperature, weight, pliability, feel and changes in the surface texture and slope.

The wish to decorate or beautify the human body has been existed from the Stone Age when the early man painted his face and his body. Even though the beauty standards have changed, the desire remains constant. The evolution of clothing has been interlinked with factors such as social, economical and technological progress of each period in the history of mankind. Basically what one sees and reacts by their clothes. The clothes can determine the age of a person, sex, nationality and socio-economic conditions. The clothes are also symbol of attitudes, values, interest and taste. They also fulfil important psychological needs of confidence. Whether one beautiful or not, it is possible to appear well dressed and well groomed by selecting clothes which brings out one's best features. Clothing plays a vital role in the physical, psychological and social development of an individual. Clothing can hide physical defects and give aesthetic pleasure to wearer through its design in dresses, Anshu *et al* (2010).

Visually challenged individual identifies clothes, the material, their tailoring style, pattern special features or texture, by touch. Most blind people develop a high degree of sensitivity to touch, especially in the fingertips and this is very important part

of clothing recognition. They learn to recognize certain garments by feeling of design lines and fabric texture. Through the help sighted people, they memorize colour and texture concepts and various ways of combining them. The finger of blind people are nimble and they are able to handle even tiny fastners without too much.

Children are wealth of nation. Children of today are citizens of tomorrow. The role of children cannot be neglected in the building of nation. They are future handlers of nation. In India, as per the census 2010, about five percent of grade school girls between 5-15 years old suffer from visual disability. Visually challenged children have remarkable capacity for learning and they overcome their natural shortcomings by heightend concentrations and sensory powers, Shetty *et al* (2010). They can perform various skilled and semi skilled tasks efficiently and accurately by touching and feeling, with or without the help of same mechanical devices, when provide with suitable training. Clothing has major role to provide them comfort and self confidence.

Fabric is an integral part of dress making and its proper selection is utmost importance. A wide variety of fabrics are available, which differ in the way they were constructed. All fabrics are differ in feel, texture, structure and look. Some of them are suitable for only limited range of garment types, others are more suitable for general dress making. The material for children should be soft, pliable and absorbant, Vimala(2010). Always check laundry instructions on the fabrics bolt when we purchase fabrics. Drip dry cotton and non-iron synthetics are best choice for children's clothes.

The objective of the designer is to make their wearer look as attractive as possible. Designing is a fundamental process through which everything we use in textile is not just the colour, shape, or decoration of article but include much more. Good design should be a balance of functions and performance with visual appeal. It takes time to plan successful decorations for any garment. Design will be important in the creation of stylish and professionally decorated garments. Trim can add special interest to children. Decorative machine stitching, embroidery, appliqué, painting, ribbon, lace, ruffles, all are used as trimmings. Children also like fabric designs such as prints, stripes, dots and plaids. Bright colours especially red and orange make them more attractive.

A garment is a three dimensional structure made from two dimensional textile clothes which is flexible in nature. Human bodies differ from person to person in size and this size basically means in height and girth. Children's body which change immediately. Adjustability and reversibility are two separate problems, the first having desirable features in connection with growing children and second being highly desirable features in connection with appearance. Appearance is of prime importance in the making of garments. Both features have a direct bearing up on economy. That is the garment if adjustable is useful for over a long growth period of child and reversible is useful for changes in appearance. Reversible garments have no right or wrong side. Reversible features in the garment help visually challenged children for easy put on and take off the garment without the help of their caretakers. Adjustable features in the garments reduce the problem related to immediate growth of children.

The specific objectives of the study are:

- To gather information on the preference of clothing requirement by visually challenged grade school girls and their care takers.
- Standardizing the body measurements for visually challenged grade school girls.
- To create adjustable and reversible garments for visually challenged grade school girls.
- To find the suitability, acceptability and evaluation of constructed garments.

Thus the present study was undertaken to identify the specific needs and problems of visually challenged grade school girls regarding clothing and finding ways to promote self dressing, so that they become more reliant, independent and confident.

REVIEW OF LITERATURE

2. REVIEW OF LITERATURE

The literature pertaining to study are reviewed under the following headings.

2.1 Importance of clothing – cotton, synthetic and blended fabrics

2.2 Clothing for grade school girls

2.3 Importance of fitting

2.4 Standardizing body measurements

2.5 Designing the garment

2.6 Drafting and pattern making

2.7 Cutting and sewing

2.8 Importance of reversible and adjustable garments

2.9 Surface ornamentation

2.1 IMPORTANCE OF CLOTHING – COTTON, SYNTHETIC AND BLENDED FABRICS

Clothing refers to coverings and garments intended to be worn on the human body. The earliest garments were made of leather or other non- fabrics, rather than cloth, but these non- fabric garments include in the category of clothing. The word 'cloth' related to fabric or textile. But clothing means fabric used to cover the body, Jefferson (2005). Clothing is an inseparable attribute of human life, expresses Zimnilewska (2010). 'Clothing makes the man' is an old saying which we accept as a truism without giving it much thought, Parvathi (2007). Clothes not only 'make the man' but also affect his facial features and the build of his body. Clothing is a part of silent language and serves as basis for forming expressions and defining human beings, Rastogi (2009).

Clothing is one of the basic needs of human being, Pant and Jain (2010). In the hierarchy of human needs, clothing ranks second topmost priority next to food, point out Naik and Marathi (2003). People wear clothes for three basic purposes namely protection, communication, and decoration, reviews Davis (2007). According to Bansal (2008),

clothing does a good deal more than clad the body for warmth, modesty or comfort. Clothes construct a 'personal habitus'.

Clothing is the 'second skin' essential for human survival, Patil and Bindigeri (2001). Clothing modifies the heat regulating function of the skin and has effects that are modifies by the environment conditions. Clothing and housing are twins, for housing extents the heat control mechanism of our organism, while clothing is more direct extension of outer surface of the body, remarks Rastogi (2009). Dress is only one of the forms in which fashion finds expression. Life is expressed in clothes, says Davis (2009).People wear clothing for functional as well as social reasons. It is the sign of civilized society and it shows the level of aesthetics, express Bhargav and Chand (2005). Seema and Meenu (2010) suggest, clothing provide physical, psychological and social comfort. Clothing is sign of personality, informs Arora (2008). Clothing contributes to attainment of certain desires, physical comforts, social participation, conformity, prestige, self expression, and attracting opposite sex, reveal Kashyap and Kulshrestha (2007).

Clothes made from fabric is primarily concerned with the properties of fabric, report Mandal and Abraham (2010). Fabric refers to cloth produced by knitting, weaving and felting of threads, says Rani (2007). Thomas (2006) states, fabric is an integral part of dress making. By knowing the qualities and difficulties of fabrics, the better decision can be able to make. There are many different types of fabrics to fit every style and taste. The proper selection of fabric is utmost important, expresses Detrixhe (2004).

Cotton is the 'king of natural fabrics' suggest Saraf and Alat (2006). Cotton, the 'white gold' is the most precious gift of nature to mankind, mention Mandoli *et al* (1999). It is a variety of plants of the genus gossipium belonging to Malvar family, Pal (2010). According to Brown (2002), the word 'cotton' is derived from Arabic. Depending up on Arabian dia-tect, it is pronounced kutan, qutn, qutun, express Gohl and Vilensky(1999). Mishra (2000) and Kesarwani *et al* (2010) point out that cotton as the oldest and most important fabric used for textile purpose. It is the back bone of world's textile trade, inform Brahma (2007) and Ravindranath and Reddy (2010). Cotton has greater economic important as the raw material for textile cloth. Cotton is the fabric for every home, express Deshwal and Khambra (2005).

Cotton for summer because it is light and absorbant, says Thomas (1999). It is a comfortable, cool, soft fibre, expresses Mahasavekar (2009). Cotton has strength, luster, hygienic protection, warmth, softness, smoothness, stretch, easy care. Cottons are available in wide range of colours that are usually fast to light, washing and perspiration, state by Singh(2004) and Chaudhari *et al*(2009). It takes many forms, from sheer gauze and light weight lawn to thick, sturdy, corduroy and denim, says Gordon(2002). Cotton is truly a high-tech fibre, suggests Barik (2008).

Synthetic fibres play a large role in our collection of technical and apparel. Synthetics are more environment friendly and recyclable, Shah(2006). Garments made with synthetic yarns are comfortable, adaptable, light weight and dry quickly. Gokerneshan (2005) chronicle synthetic fabrics have a smooth and uniform surface. They have ability to reflect light and thus give very high luster. Synthetic fabrics are more durable than their natural equivalents, wash more easily and need less careful ironing, by Paine (1987). Synthetic fleece keeps person warm and dry in the winter and synthetic base layer keeps cool, and dry in summer, Corbman (2009).

Some fabrics are made of different fibres and this type of mixing of different fibres to construct a fabric called blending, express Sumati (2002) and Sangwan *et al*(2006). According to Clayton (2008), manmade yarns often tend to creaseless and can be easier to launder, so they are often added to natural yarns to improve these qualities and reduce the cost. Cotton/ polyester blends are best choice for garment construction. Polyester will provide wrinkle resistance and shape retention, while cotton will provide absorbency and comfort, says Singh (2004). In terry cotton, cotton and polyester are blended. They keep their crisp like new appearance, longer than the natural fabrics do, informs Detrixhe (2004). Blending helps in exploiting outstanding positive attributes of each fibre and at the same time offers an effective means of minimizing the negative characteristics of individual component, Singh and Goel (2001).

2.2 CLOTHING FOR GRADE SCHOOL GIRLS

Dress and appearance are pertinent components in the child development, Damhorst *et al* (2001). Designers of children's clothes should be aware of the way that child's body shape changes as it grows. By the age of seven posture child has been straightened. The average child has greater relative increase in body height to girth. Girls waist develops more shape. At this stage the legs of children of both sexes grow faster than trunk, says Aldrich (2004).

"Personality which constitutes distinction of person". Each child has its own personality, made up of sum total of her physical characteristics and sum traits and summarized in the impression she makes on her friends and family and their estimate of her, by Hayavadana (2004). The grade school girl is a developing personality and not matures one. The most appropriate type of clothing for her will be simple and functional, gay and youthful. Children were supposed to act like adults and they were discussed in a miniature version of adult's apparel, remarks Frings (2001).

Suitable clothing for grade school child meets the social and emotional needs of the age group. Children of this age group, especially girls, become independent and opinioned on the subject of what they will and will not wear, says Gupta (2008). Comfort is the absence of unpleasantness or discomfort or a neutral state compared to the state of pleasure, Singh and Chattergee (2010), Comfort which reflects good fit, proportion and function is more important in the creation of children's wear. While adults are sometimes willing to sacrifices comfort for aesthetics, children never are, expresses Armstrong (2005).

A dress should be comfortable children reach and stretch when they play. A sleeve less dress, a dress set in a deep armscye or one with raglan sleeve would be comfortable. Pleats, gathers or tucks should be used to let in fullness. A dress should be easy to put on and take off. Front opening is highly desirable. A few fastners as possible and those easy for child to work with ,should be used suggest Thomson and Rea (1990). According to Sarkar (2010), self-help is relatively recent requirement children's clothing. Openings of the garment should be large enough to permit easy donning and doffing of the garment.

Numbers of fastening should be minimum cloth loops are more easily handed than button holes. Hooks and eyes, small buttons are all understandable as they are difficult to handle and this discourage the child's efforts at self help suggests Das (2009).

Choice of material for the various garments affects greatly the satisfaction in their use. The material should be facilitate the maintenance of body temperature, absorb body moisture readily and also durable and cleaned, expresses Sarkar (2010). Soft, pliable, absorbent clothes are best for children's clothes. For making movement easier it is wise to choose fabric that are labeled, washable, colourfast and preshrink. For busy mothers, drip dry cottons and appropriate non iron synthetics are boon, Bansal (2008). Clothing for school children should be serviceable and attractive. Among the fabric suitable for dress is gingham in plain colours. Narrows strips, small dots all look charming on children, Brannon (2007). Colours for grade school can be brighter, clearer than suitable cloth for adults, especially red, orange are more preferable, suggests Mullick (2007).

Because of people with disabilities from a significant proportion of society, the disable must have access to opportunities for contributing to the running of the society in which they live. Their energy, skill, and creativity, if efficiency used, will not only remove their sense alienation but will also help to make the world more caring, Purani and Rawal (2000). Blindness is regarded as the most severe and traumatic physical handicap. Since more impressions are conveyed through the eyes, the visual anomalies may influence the life of the individual in physical, mental, social, vocational and educational aspects. In our society visually impaired have always been the favoured group as compared to those with other types of handicaps, says Goel (2004).

Visually challenged children have a remarkable capacity for learning their natural short coming by heightened concentration and great sensory powers. They can perform various tasks efficiently and accurately by touching and feeling, with or without some mechanical device when provide with suitable training, express Krishna *et al* (2001). Patel and Chaukar (2007) point out, self help garment with functional design features would help them to become independent, so as to gain self confidence. The fabric should be comfortable to improve aesthetic appeal of the garment.

2.3 IMPORTANCE OF FITTING

Good fit is a combination of two components: a garment must look good and must be comfortable,reports Betzina(2003). Although the concept of good fit varies depending on our different shapes and tastes. In today's era, fashion gives more importance to well fitted garments, state Gupta *et al* (2005). Good fit starts with accurate measuring, (www.tauton.com/pdf/fitting). The body measurements translated to the pattern so that we can sew a proper fit garment, (www.ditzyprints.com/fitting.htm). Proper fit in garment is very essential which depends up on proper size. This indicates that successful dress making begins with a right size based on correct measurements, by Bala *et al* (2008).Fit of the clothing is important as it may influence the individual both physiologically and psychologically. Verma (2006) quotes, an economic loss as well as discomfort to mind and body, may results from ill fitted clothing. As much as ten percent of influence due to poorly fitted garments. Clothes fit correctly if there is uniform snugness with reasonable amount of looseness for the organism, as a conscious and living various active machine with vital and mental processes, to carry on within the clothes, Betzina (2003).

First principle in fitting is that garment should be uniform to the body when various positions are taken. It should be comfortable when one seated as well as one is standing and should allow freedom of movement. Second principle in fitting that the basic seam or design lines of garment should be placed either in contour lines of the body or related to points of articulation. The third principle is that fabric must so handled that the fitting of the fabric are held parallel at one or more following places like chest, scye, hip lines and where ever they are held parallel, the warp yarns are perpendicular to them, as well as parallel to centre front, Sarkar (2010). Well fitted garment feels comfortable and adjust naturally to the movements of the wearer. It hangs or sets smoothly without wrinkles or sagging. Good posture is important in reducing individual differences that cause a garment to fit poorly. The factors which affect good fit are grain, set, line, balance and ease, remarks Mathews (1985).

2.4 STANDARDISING BODY MEASUREMENTS

Standardizing the body measurements can be obtained in two ways-taking individual measurements if designing individual only or by using measurements represents standard size if designing for a group. Standardization is important so that designer is always working from same base. Verma (2006)and Kapildev (1999) quote, perfect fitting of a solely depends on correct measurement. Betzina (2003) expresses that measurements are essential to the fitting process, but valuable information can also be gained simply from studying the body from all ages.

Correct standing position is essential to get correct measurements, remark Doongji and Deshpande (1988). Keep in mind, lay the tape measure flat against the skin, and don't let it drop. The person should be wearing her normal under garments only, (www.joyshoppe.com/how to measure/ htm). According to Saluja (2006), the measurements should be taken over a smooth fitting foundation garment. Hold the tape parallel to the floor for horizontal measurements and perpendicular to the floor for vertical measurements (www.curvycounselor.com/ how-to-take-body measurements). Cooklin (2004) describes, the measurements were taken from anatomical land marks marked on the body with a skin pencil.

The measurements should be taken comfortably, without pulling the tape too tight or too loose. Try to know the customers requirement regarding the fit, style, shape, pockets, collar, buttons, seam finish before taking measurements. Observe the figure carefully and record it in an order book. The person should stand erect, but in a natural pose, in front of a mirror. The measurements should be taken in a proper order and with certain sequence. All girth measurements should be taken tightly, as ease for movement is included in the draft. To avoid any mistake, take the measurements twice, emphasizes Zarapkar (2008).

2.5 DESIGNING THE GARMENT

Design is an art. It is like a river flows slowly. It makes no abrupt changes of direction but over the years its character gradually varies. It carries on its current many beautiful things out of the past which we still treasure even though we have no desire to

copy them today. We should hope that things we do now will have similar values for future, Yadav *et al* (2007).

Design is an arrangement of parts, form, colour, fabric and line for introduction of style, expresses Sodia (2000). A design is anything to which a man has put his mind and talent to change or recognize natural materials and forms, says Neelima (2009). Design can be divided into two- structural design and decorative design. Structural design is most important means of identification. It represents the fundamental characteristics of article under consideration. It includes color, quality and texture of the material to which the article has been formed. Decorative design is surface treatment that is not necessary to the functional aspects of an object but which is intended enhance the under lying structure, by Cox and Warren (1996).

Designing is a fundamental process through which everything we use has come about, comment Heron and Reinford (1999). Designing seems to be quite simple and superficially. But the designer while designing the garment has to really keep various concepts in mind like fabric, texture, grain of the fabric, measurement and theme, says Narang. As stated by Tata (2004), the designer must be aware of current life styles and trends. Designer should develop sensitivity to objects and ideas. The ideas related to design is personal experience, they can come from museums to ink blots, they can be completely original and connected to designer in a very individualistic way; suggest Kelvey and Munslow (2005).

2.6 DRAFTING AND PATTERN MAKING

A garment pattern is produced from design sketch, state Mee and Purdy (1987). Designer documents her ideas in the sketches and first draft. Pattern maker analyses the sketches and develop pattern pieces. There are several methods to developing pattern pieces. It includes drafting, draping, and flat pattern techniques, report Gatterson and Stewart (2007).

Drafting is very basis for all practical operations involved in dress making, says Sodhia (2007). Drafting is a small scale plan of garment, based on measurements taken and the term used for the development of a garment shape on a paper. It is made by

means of direct body measurements coupled with proven formulae, enable one to create a successful shape and fit, expresses Mullick (2002). The draft can be developed from model measurement chart or measurements taken from standard measurement chart, reveals Armstrong (2005). Zarapkar (2008) points out, while drafting the diagram, always starts from right to the left side and from nearest edge of the paper. If there is a fold at one side in the diagram, draft the diagram in such a way that diagram line will come on the fold. Seam allowance is included in all drafts, do not keep extra material outside the diagram, except for inlays and inturns.

Draping is the manipulation of the fabric on a 3-dimensional form by a designer to obtain perfect fit, explain Amaden and Crawford (1994). Draping in fabric on a dress form is a method that is used to create models, which will ultimately develop into a collection of finished sample garments. The medium for draping is usually muslin, a plain weave fabric of unfinished cotton. Designers are quite creative as they work their ideas directly in fabric on a dress form, most designers drape from sketch, quote Jaffe and Relis(1993).Flat pattern designing based on manipulation of a plain foundation pattern is simple, economical and practice. Basic slopes are made like basic draft and it can be adapted for particular design, Cooklin (1995).

Pattern is a sample of body measurements which can laid out on the fabric to yield proper size garment, reports Neelima (2009). It is final piece of paper ready to place on the fabric. Each piece usually has all the information needed for cutting out the fabric and making the garment. One can add seam allowance and hem allowance, but this must be clearly noted on the patterns. The following information should be marked on pattern. It includes name of each piece, pattern size, centre front and back, fold line, grain line, construction marks (tucks, pleats, darts),seam allowance, number of pieces to be cut, views Aldrich(1990).

Block pattern or sloper is the term used to describe the basic unstyled pattern. The basic bodice made up of five distinct parts namely front and back bodice, front and back skirt, full length sleeve, Cooklin (2004). From the basic pattern all other patterns are made. The major advantage of pattern making is the original working pattern can be used as a basic for developing a variety of other pattern shapes. Lines, checks, and one way

prints can be easily matched by pattern making. It is also an economical one. The disadvantages are if basic pattern is wrong then it affects pattern making. Difficult to judge whether a particular design adapted will suit the wearer or not. It is a time consuming process, Sharma and Kaur (2003).

Layout is adjusting the pattern on the fabric to make sure the best usage of cloth and correctness in cutting. The pattern should be laid with grain of the fabric. So that yarns remain smooth and stretchiness, informs Verma (2006). The thread direction in the woven fabric is called as grain. The lengthwise grain identifies that run parallel with the selvedge. Cross grain identifies the thread run across the fabric. In weaving length wise grain is called 'warp' and cross wise grain is called 'weft' quotes Mullick (2002).Detrixhe (2004) notes, while laying the pattern, begin by pinning the largest pattern to the fabric. Be sure that fabric is smooth and folded properly. Long double ended arrows on the pattern needed to be straight with grain of the fabric.

2.7 CUTTING AND SEWING THE GARMENT

Cutting is the preproduction process of separating a spread into garment parts that are precise size and shape of pattern pieces on a marker. The cutting process also involves transferring marks and notches from marker to garment parts to assist operations in sewing. Cutting often carried out in two stages- rough cutting(separating the individual pieces) and final cutting(accurate cutting of the individual shapes), reveals Pundir(2007).According to Cooklin (2007), the central process in manufacturing of clothing is joining together components, that is sewing. Sewing is an ancient craft involving stitching of the clothes, leather, animal skin or others. Sewing is primarily used to produce clothes, says Pundir (2007).

2.8 IMPORTANCE OF REVERSIBLE AND ADJUSTABLE GARMENTS

Clothing for children will typically be worn by a child for brief period of time. Children grow and develop rapidly that a given outfit is quickly outgrown. Therefore the purchase of children's garments is a frustrating experience. Adjustable clothing which can be easily adjusted to a fit a wide range of varying sized children (www.googlescholar.com).Adjustable garments provided that are adapted to adjust in

size, to fit the body of an individual. An adjustable garment is provided that includes a unique a tightening mechanism for selectively adjusting the garment's girth and creates an attractive, comfortable garment, (www.freepatentsonline.com/42010/0306901.html). An adjustable garment having an elongated length of fabric adapted to positioned adjacent the body portion of the wearer. A securing arrangement is formed on the surface of the body which extents transversely around the garment for adjusting garment length, (www.googlescholar.com).

Reversible garment can be worn two ways. There is no true 'inside out' to a reversible garment, since either way it gives fashionable appearance. Reversible garments have some feature unlike other types of garments, such as thicker overall fabrics, since two fabrics are sewn together. For reversible garment, buttons on both sides and different types of stitching (http//:en.wikipedia.org/ wiki/reversible-garment). Selection of fabric for reversible garment demanded three qualities namely attractiveness, suitability and durability, by Rastogi (2009). To get an idea of weight in the completed garment drape both fabric over the hand. Use patterns with minimal seams and details, (www.accessmylibrary.com/article-1g1-118450939/reversibleclothing-model-versatality.html).

2.9 SURFACE ORNAMENTATION

Surface designing is superficial decoration or surface enrichment of substrate, the fabric express Naik and Wilson(2009). Udale (2008) says that once fabric has been constructed, it can be enhanced or alter the application of different kinds of surface treatments. According to Bishop (2004), trims are necessary supplies used to finish adorn both garments and accessories. Trimmings can be classified into two- decorative and functional.The huge array of decorative trimmings includes embroidery, appliqué, fabric painting, ribbon, laces and sequins. Often functional trimmings include buttons, press studs, zippers, elastics and other fastners.

RESEARCH DESIGN

3. RESEARCH DESIGN

The methodology pertaining to the study on "CREATING ADJUSTABLE AND REVERSIBLE GARMENTS FOR VISUALLY CHALLENGED GRADE SCHOOL GIRLS" is discussed under following headings:

3.1 Conduct of the survey.

3.2 Designing the garment.

3.3 Standardizing the body measurements.

3.4 Drafting the basic pattern.

3.5 Preparing the muslin pattern.

3.6 Evaluating the muslin pattern.

3.7 Developing pattern for reversible and Adjustable Frocks.

3.8 Instructions about constructed garments.

3.9 Evaluating the constructed dresses.

3.1 CONDUCT OF THE SURVEY

Surveys are concerned with the collection of information from a specified target population. Often the information is collected from a sample of population and the investigator generalize the results obtained from sample to whole population, state Taylor *et al* (2008). Since the study was focused upon a particular group-visually challenged, a survey method was selected to collect the required data for the research design.

3.1.1 Selection of the area and Target groups

There may be many appropriate schools for visually challenged. Kerala has special centres for visually challenged grade school girls. The investigator identified Government school of blind in Kasargod, Deaf and blind school in Kannur and Calicut as centres for data collection. Besides, ease of approach, co operations extended by the organizer of the school familiarities were the criteria taken into account for selecting the school. The investigator selected 100 visually challenged grade school girls and their mothers based on their willingness to respond, and co operation extended by them for study. Mothers play a very important role in the

selection of dresses for grade schoolers and special for visually challenging, mothers also spend a considerable time in helping or grooming their children, therefore the interview was conducted on selected mothers also.

3.1.2 Selection and Formulation of tools

The tools are the ways and means to conduct research. The tool selected for conduct of the survey is an interview schedule. Interview is a best method of data collection that is specially being applied where opinions and attitudes of respondents are necessary, review Sharma and Khan (2009). Hence interview method was selected for the study. The interview schedule comprised of questions pertaining to the state of blindness, need of special features, choice of dresses, fabric, texture, type of material, style, colour combinations, surface enrichments suitable to their visually challenged daughters and also dresses for different climatic conditions.

It was found necessary that the information collected directly from mothers of selected subjects. The interview schedule is given in Appendix-I

3.1.2 Collection, Analysis and Interpretation of data

A survey is a process of collecting data from existing population, Gupta (2003). The investigator approached the selected subjects personally and the purpose of study was explained to them. The questions from the prepared schedule were put forth one by one and the answers were recorded instantly from the girls and their mothers simultaneously. The collected data were consolidated systematically, analysed and presented in the Chapter “Results and Discussion”.

3.2 DESIGNING THE GARMENT

Design is a plan intended for some definite purpose,describes Neelima (2009). Design ideas are developed through in different ways depending upon how an individual designer likes to work. Much design work is carried out in a very direct and formal way. The degree of formality becomes a function of scale and number of interests represented, expresses Wilson (2005). Based on the survey conducted, the investigator designed sixteen frocks. These designs were shown to mothers. The

special features of each design were explained with at most care. The best six designs were selected for construction. The designs are given in appendix II.

3.3 STANDARDIZING THE BODY MEASUREMENTS

To standardize the body measurements, taking measurements of large number of girls and completing them in a chart form. By using the chart as a guide for making basic pattern, from which all other pattern are made, states Blaxland (2001). The steps involved to standardize the body measurements are as follows.

3.3.1 Selection of the sample

The investigator identified randomly 100 visually challenged grade school girls as subjects from Government School for Blind in Kasargod, Deaf and Blind schools in Kannur and Calicut, Kerala for the study.

3.3.2 Taking body measurements

Two groups of measurements relative to pattern making, were taken from each size chart and collated under their respective headings namely horizontal measurements and vertical measurements which represent girth and girth related measurements and height and height related measurements respectively.

The body measurements of 100 visually challenged grade school girls under the age group 6-12 years were taken for the conduct of the study. Ensuring tape measure does not slip down at the back. As the principles of body measurements, states by Aldrich (2003), the various required body measurements were taken by the investigator and were recorded carefully in a sequential order which is given below.

Girth related measurements (horizontal)

- Chest: the maximum girth measurements under the armpits with the tape passing over the shoulder blades and across the chest.
- Waist: the measurements of natural waist girth measurements with child's abdomen relaxed.
- Hip: the horizontal measurements taken around fullest part of the seat.
- Across back : the measurements taken across the back from armscye to armscye midway between the cervical and the base of armscye.

- Across chest : the measurements taken between anterior armscye.
- Neck base girth : the girth measurements taken around base of neck.
- Shoulder: the measurements taken from the base of the neck to the shoulder edge.
- Upper arm girth : the girth measured around the upper arm midway between shoulder and elbow.
- Wrist: the girth measured at the base of arm over the wrist bone.
- Maximum thigh girth :measurements around the part of the leg

Height related measurements (vertical)

- Height : measurements taken from crown to soles of feet
- Cervical height : measurements taken from cervical to soles of feet
- Cervical to knee : measurements taken from cervical to knee line at back
- Neck to waist : measurements taken from cervical to back waist line
- Waist to knee : measurements taken from waist to knee line at side
- Depth of scye : measurements from cervical to armscye base line
- Trunk line : armscye base line to waistline
- Waist to hip : from waistline level to hip line level at side
- Hip to knee : from hipline level to knee at side
- Knee height : from soles of feet to knee level at side
- Side seam : waist level at side to soles of feet
- Inside leg : base of trunk to soles of feet
- Body rise : waist line to base of trunk
- Arm length : shoulder point to wrist line
- Under arm length : armscye base to wrist line

Figure 1 show the illustration depicting method of taking various body measurements.

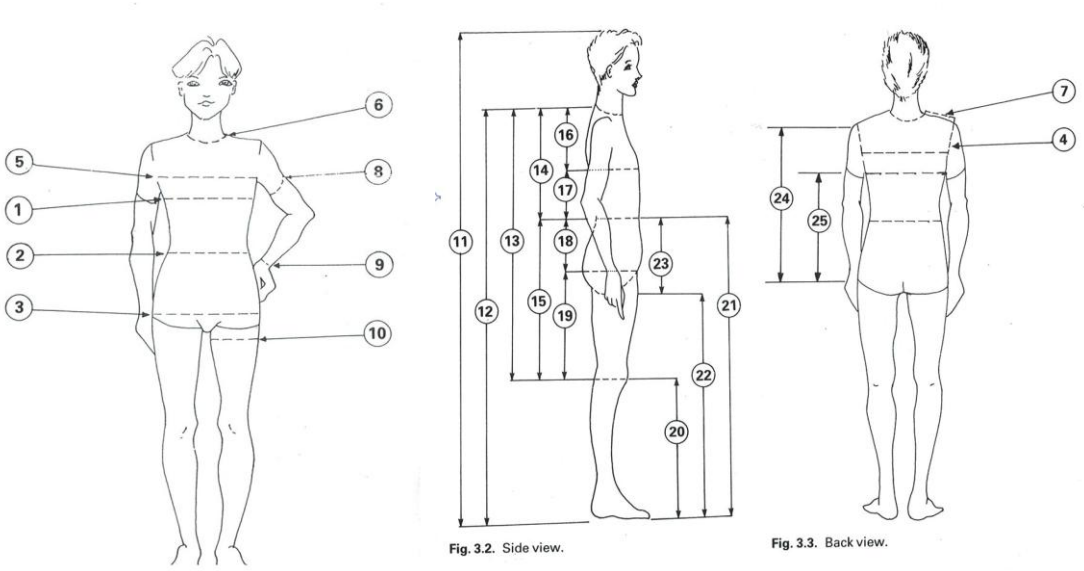


Fig. 3.2. Side view.

Fig. 3.3. Back view.

Figure –I

Method of taking various body measurements

The various body measurements taken by the investigator are presented in Appendix-III

3.3.3 Standardizing the body measurements

Standardization of body measurements is necessary to get a specific set of body measurements which is said to be representation of the whole sample, Mullick (2002).In order to standardize the body measurements, each body measurements were divided into specific class intervals. The body measurements of selected visually challenged grade school girls were grouped based on specific class interval. The details are presented in the Table I.

Table I

Classification of various body measurements of the visually challenged grade school girls

Body measurements required for frocks	Range (in cm)	Number of visually challenged grade school girls
Chest girth	50-55	20
	55-60	14
	60-65	36
	65-70	18
	70-75	11
	75-80	1
Waist girth	45-50	8
	50-55	14
	55-60	42
	60-65	26
	65-70	10
Hip girth	50-55	4
	55-60	16
	60-65	21
	65-70	15
	70- 75	24
	75-80	12
	80-85	8
Shoulder to shoulder	20-25	25
	25-30	46
	30-35	29
Waist length	20-25	24
	25-30	45
	30-35	31
Front neck girth	8-10	22
	10-12	47
	12-14	32
Back neck girth	6-8	24
	8-10	42
	10-12	28
	10-12	6
Knee length	55-60	12
	60-65	38
	65-70	13
	70-75	14
	75-80	13
	80-85	10

Sleeve Arm scye round	 20-25 25-30 30-35 35-40	 15 28 36 21
Lower arm circumference	15-20 20-25 25-30	47 39 14
Half sleeve length	6-8 8-10 10-12	23 48 29

The mode is the value about which the items are most costly concentrated, describes Gupta (2006). The body measurements were standardized by finding the modal value using the formula,

$$M_O = L + \frac{\Delta 1}{(\Delta 1 + \Delta 2)} \times i$$

Where L is the lower limit of the modal class, Δ_1 is the difference between the frequency of modal class and pre modal class, Δ_2 is the difference between modal class and post modal class and *i* is the class interval of the modal class.

Thus the mean value of 100 body measurements is taken into consideration to calculate the standard body measurements. A sample calculation of the modal value is given in Appendix-IV.

The standardized body measurements of the visually challenged grade school girls is given in the Table II.

Table –II

Standardized body measurements for visually challenged grade school girls

Body measurements for frocks	Standardized body measurements (in cm)
Chest girth	62.75
Waist girth	58.0
Hip girth	72.1
Shoulder to shoulder	27.1
Waist length	28.0
Front neck depth	11.2
Back neck depth	9.1
Knee length	62.5
Arm scye round	31.7
Lower arm circumference	19.0
Half sleeve length	9.13

3.4 DRAFTING THE BASIC PATTERN

Drafting is a small scale plan of garment, based on measurements taken and the term used for the development of a garment shape on a paper. It is made by means of direct body measurements coupled with proven formulae, enable one to create a successful shape and fit, expresses Mullick (2007).

3.5 PREPARING THE MUSLIN PATTERN

To eliminate the hazards in constructing, it is necessary to construct a muslin pattern of the entire garment to know the fitting and placement of additional construction features. The muslin pattern gives the individual preview of the garment appear on the wearer, states Huxley (1996). So the investigator constructed muslin patterns with following steps for selected garment.

3.5.1 Preparation of the fabric for cutting

Proper fabric preparation is an essential preliminary for cutting. Grain of the fabric were checked and straightened by stretching method. The edge of the fabrics were straightened by drawing and cutting a thread on a prominent line. The perfection of grain of the materials were checked. The material were ironed to remove all the creases, emphazises Blaxland (2001). Thus the material was prepared for cutting. Detail of the selected muslin fabric is given in Appendix V.

3.5.2 Transferring the pattern on the fabric

The material was placed on a large table, with the wrong side facing outside. The pins were placed within a seam allowance at right angles to the cut edges. The outline of the pattern was drawn using tailor's chalk. The tracing wheel and carbon paper method were used to mark the pattern lines on the material. Marking was done by inserting a dress maker's carbon paper between the material and paper pattern and tracing wheel was moved firmly on the paper pattern as mentioned by Mathews(1985).

3.5.3 Cutting the material

Cutting greatly depends upon the fit and style of the garment. Material cannot be 'eased in' during construction. Entire layout was planned before cutting out any separate part to ensure that there was sufficient material for the entire garment. The fabric was folded double whenever possible with the right side together and on the true grain. The larger piece of the pattern pieces were placed first followed by the smaller pieces. Adequate seam allowance was left for each piece. The pattern then pinned on to the fabric at right angles to the edges. A sample layout is given in Appendix VI.

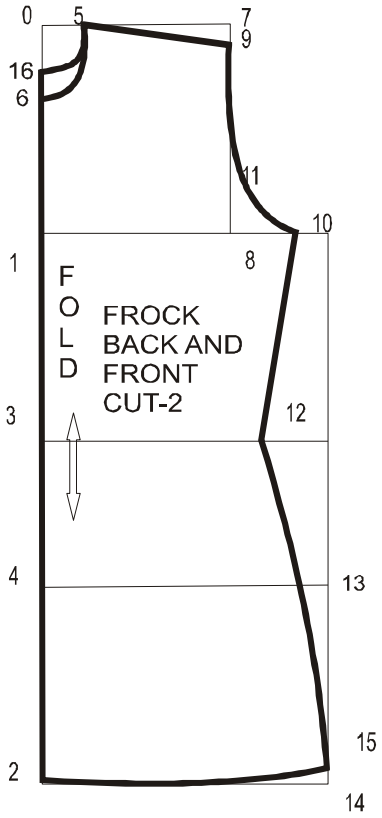
The muslin fabric was held firmly onto the cutting table with the left hand while the right hand simultaneously cut the pattern with long even strokes exactly along the cutting line without shifting the position of the fabric. Notches were cut wherever necessary to match the pieces during the construction process. The pattern details such as dart lines, seam lines and cut number were marked on the fabric. Stay stitching was done to prevent the yarns from raveling.

3.5.4 Constructing the muslin pattern

The pattern must be completely sewn together, including sleeves, in order to get complete fit and look. The entire pattern was sewn with a machine basting stitch. The steps involved in the construction of a basic frock is given below.

Measurements:

Chest round	– 63cm
Waist round	–58cm
Hip round	– 72cm
Waist length	– 28cm
Front neck depth	– 11cm
Back neck depth	– 9cm
Shoulder to shoulder	– 27cm
Frock length (knee length+10cm)	–73cm
Sleeve length	– 9cm
Armscye round	– 32cm
Lower arm circumference	–19cm



Drafting:

Front part:

Take two layers of fabric for front and back
Fold at 0-2.

1-0 = 1/4chest + 1.5cm(18.25cm)
2-0 = full length + 1.5cm(74cm)
3-0 = waist length + 1.5cm(29.5)
4-0 = waist length +10cm(38cm)
5-0 = 1/12chest + 1cm(6.2cm)
6-0 = front neck depth(11cm)

Shape front neck 4-5 as in the figure,
and extend the line to C.

7-0 = 1/2 shoulder + 1cm(14.5cm)

Square down from 7-8

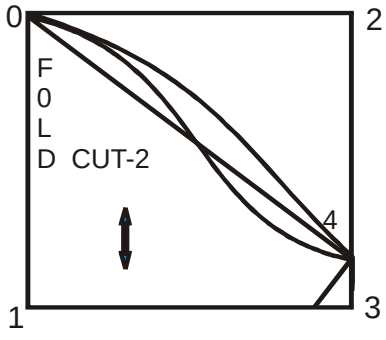
7-9 = 1.5cm

Join 4-8

10-1 = 1/4chest + 4cm(19.75cm)
11-8 = 2.5cm

Shape scye 8,10,9

12-3 = 1/4waist round + 4cm(18.5cm)
13-4 = 1/4 hip round + 4cm(22cm)
14-2 = same as 10-1+4cm(23.5cm)
15-14 = 1.5cm



Shape bottom15-2

Back part:

Take two layers of fabric of different colours for back part with fold at 0-2.

0-16 = back neck depth(9cm)

Shape neck 16-5.

Except 11, the proportions of points 6-15 are the same as front.

Shape scye 9-11-10.

Plain sleeve:

Draw diagram two layer fold 0-1-2-3

0-1 = sleeve length(9cm)

0-2 = ¼ chest(15.75cm)

Square down from 2 to3

2-4 = 1/8 chest

Join 0-4

Shape front and back scye depth

1-5 = 1/2 lower arm circumference

Construction details:

- Wrong side of the basic pattern was placed on the wrong side of the bodice back pattern
- The shoulder seam were matched and lapped seam is used to avoid wrong side
- Neckline were finishd using shaped facing
- Plain basic sleeve were attached on the armscye of the bodice block
- Side seam of the sleeve and bodice were tacked together, matching them and sew together using lapped seam
- Front opening was finished by binding
- Bottom hemline finished by folding
- Press button is attached at the centre front for opening and closing the garment.

3.6 EVALUATING THE MUSLIN PATTERN

The constructed muslin (Plate-I) were evaluated for fitness trying them out on 20 selected visually challenged grade school girls whose body measurements were nearer to standardized body measurements. A Performa (Appendix- VII) was used to collect information directly from selected subjects regarding their satisfaction about each and every measurements of muslin patterns. The details were given in the Chapter Result and Discussion.

In order to evaluate the fitness of constructed muslin patterns, fifty judges comprising of PG students, mastering Textiles and Clothing, Avinashilingam Deemed University for Women, Coimbatore, were selected as they had enough knowledge on textiles and clothing. A Performa (Appendix-VIII) was prepared and given to the selected judges. They were requested to evaluate the constructed muslin patterns by checking the fit on visually challenged grade school girls whose measurements were nearer to the standardized body measurements. The data thus collected was consolidated and presented in the Chapter Result and Discussion. Based on the muslin pattern, the necessary modifications were incorporated in the final frock styles.

PLATE-I

CONSTRUCTED MUSLIN FROCK

3.7 DEVELOPING PATTERNS FOR FROCK STYLES

From the survey it was found that almost all mothers as well as the visually challenged grade school girl's preferred frocks with 100 per cent cotton, 100 per cent synthetic like crepe and 60/40 terry cotton for their casual wears. Soft textured fabrics with different prints were accepted by mothers. They also preferred plain painted and embroidered fabrics for occasional wears. Keeping this in mind investigator

purchased cotton, synthetic and terry cotton fabrics for six sets of frock styles. Investigator purchased 12 different varieties of fabrics for double layered reversible garments. The selected materials are given in the Appendix IX.

According to consolidated interview schedule, 96 per cent mothers prefer elastic band across the girth and 95-50 per cent of mothers prefer buttons, Velcro and adjustable straps for adjusting the length.

Regarding surface enrichment most of mothers preferred printed material for casual wears and embroidery, painting and appliqué for occasional wears. As per the choice of priority mentioned by visually challenged grade school girls and their mothers the selected frocks styles were enriched with selected variations. The nomenclature of the frocks styles is given in the Table III.

Table III

Nomenclature of the frock styles

Number	Nomenclature of the frock styles	Code
1.	CMpSfWoSsPSsaSaWsAn	CF_1
2.	CVpSfWoSsPSsaSaWsAn	CF_2
3.	CWcrAfFoPbBaPsBtaBaPsInN	CF_3
4.	CAbAfFoPbBaPsBtaBaPsInN	CF_4
5.	CBspAfFoElEPaEaCsInN	CF_5
6.	CBPpAfFoElEPaEaCsInN	CF_6
7.	CRbcPrfWoAVaEaRsBn	CF_7
8.	CRbcPrfWoVaEaRsBn	CF_8
9.	SWdSfWoSsEaWsAn	SF_1
10.	SWaSfWoSsEaWsAn	SF_2
11.	BYpUhfWoSsRGaEaWsNn	BF_1
12.	BBpUhfWoSsRGaEaWsNn	BF_2

Fabric:

C - Cotton
S - Synthetic
B - Blend

Fabric styles:

Wcr - white and red
Ab - alphabetic print
Bsp - sky blue plain
Pp - pink plain
Yp -Yellow plain
Bp - blue plain
Wp - white dotted print
Wa -white abstract print
Mp - magenta plain
Vp -violet plain
Rbc -red and black checks

Fastners:

Ss - shoulder strap
P - press button
B - button
V - velcro

Length adjustable features:

Ssa - shoulder strap attachments
Bta - button attachments
Va - Velcro attachments

placket opening:

Fo - front opening
Wo - without opening

Frock styles:

F - frock
Af - A-line frock
Uhf - umbrella frock with halter top
Sf - summer frock
Prf - plain frock with raglan sleeve

Girth adjustable features:

Ea - elastic adjustable
Sa - strap adjustable

surface decoration:

E - embroidery
P - painting
A - applique

Sleeve:

Ps - puff sleeve
Ws -without sleeve
Pa - pleat attachments
Cs - cape sleeve

Neck lines:

An - adjustable neck
InN - informal neck
Nn - normal neck

3.8 DETAILS OF CONSTRUCTED FROCKS

The details of the frock styles with variations are given below.

Summer frock – style I

Since the variation is a reversible garment, two color combinations of fabrics, magenta (PLATE II-CF_1) and violet (PLATE III-CF_2) are used. In the summer frock, the length of the garment can be adjusted using press buttons at shoulder straps(PLATE V-Length and fit adjustable features). The fitness of the garment can be adjusted at the waist line using cord and to enrich the garment contrast painting is done(PLATE IV- Fabric painting).

Measurements:

Full length = 72.5cm
Chest round = 63cm

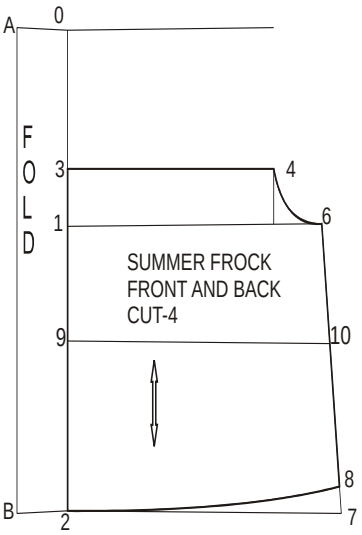
Waist length = 28cm
Waist round = 58cm

Drafting

Front and back

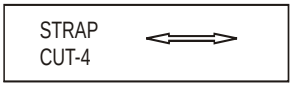
Take four layers, two layers for front and two layers for back of different colours.
Fold at A-B.
Draw line 0-1-2-3 at a distance 10cm from A-B.

0-1 = 1/4 chest (15.75cm)
0-2 = full length +1cm(74cm)
1-3 = 2.5cm
3-4 = 1/4 chest – 1cm(14.75cm)
Square down from 4-5
1-6 = 1/4 chest +4cm(19.75cm)
Shape 4-6
2-7 = same as (6-1) +4cm(23.75cm)
Join 6-7
7-8 = 2cm
Shape 2-8
0-9 = waist length(28 cm)
9-10 = ¼ waist round+4cm(11cm)
Mark line from 9 to 10.



Strap

Length = 1/4 chest+13cm(28.75cm)
Width = 5cm



Construction lines:

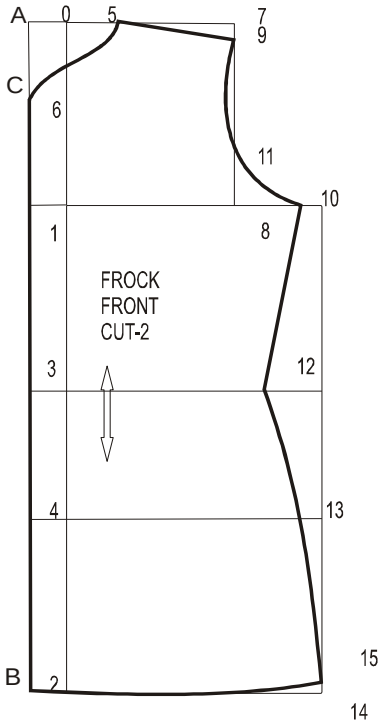
- Place two layers of fabric of different colours, right side facing
- Join 3-4 and 4-6 for armhole as in the figure, turn it out
- Made a row of stitching at 1-6
- Insert ¼ inch elastic through the stitch row to adjust the chest fitting
- Stitch back part the same way
- Join front and back part, right side facing using plain seam,turn it out
- Made two rows of stitching at 2.5cm on waist line
- Finish the hem line using pleated panel
- Join the strap at 4-3 line
- Insert a cord through the stitched rows at waist line to adjust the girth measurements
- Adjustable suspenders used to adjust the length of the garment
- Painting on both side made reversible garment more attractive.

A line frock - style I

Since the variation is a reversible garment, two color combinations of fabrics, white and red checks (PLATE VI-CF_3) and abstract print (PLATE VII-CF_4) are used. In this A line frock, adjusting the length and fitness of the garment, using different types of buttons(PLATE VIII-Length and fit adjustable features). Puff sleeve also attached at the arm scye of the garment.

Measurements:

Chest round	– 63cm
Waist round	–58cm
Hip round	– 72cm
Waist length	– 28cm
Front neck depth	– 11cm
Back neck depth	– 9cm
Shoulder to shoulder	– 27cm
Full length	–72.5cm
(knee length+10cm)	
Sleeve length	– 9cm
Armscye round	– 32cm
Lower arm circumference	–19cm



Drafting: Front part

Take two layers of fabric of different colours for front, fold at A-B.

Draw line 0-1-2-3 at a distance 10cm from A-B.

1-0 = 1/4chest + 1.5cm(18.25cm)

2-0 = full length + 1.5cm(74cm)

3-0 = waist length + 1.5cm(29.5cm)

4-0 = waist length +10cm(38cm)

5-0 = 1/12chest + 1cm(6.2cm)

6-0 = front neck depth(11cm)

Shape front neck 4-5 as in the figure, and extend the line to C.

7-0 = 1/2 shoulder + 1cm(14.5cm)

Square down from 7-8

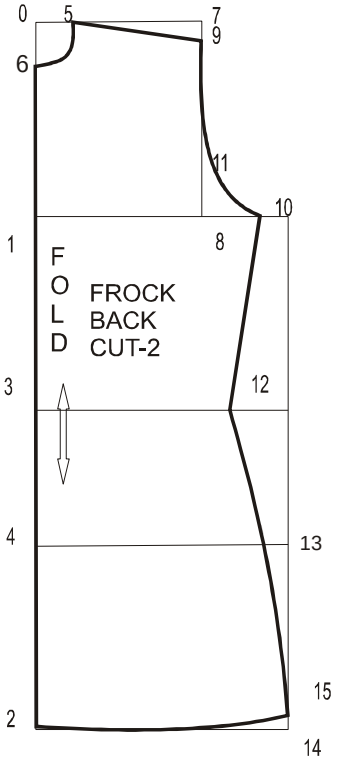
7-9 = 1.5cm

Join 4-8

10-1 = 1/4chest + 4cm(19.75cm)

11-8 = 2.5cm

Shape scye 8,10,9

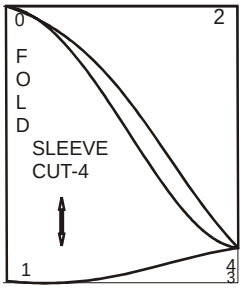


12-3 = 1/4waist round + 4cm(18.5cm)
13-4 = 1/4 hip round + 4cm(22cm)
14-2 = same as 10-1+4cm(23.5)
15-14 = 1.5cm
Shape bottom15-2

Back part:

Take two layers of fabric of different colours
for back part with fold at 0-2.
0-6 = back neck depth(9cm)
Shape neck 4-5.
Except 11, the proportions of points 6-13
are the same as front.
Shape scye 9-11-10.

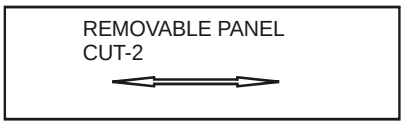
Puff sleeve:



Draw diagram on eight layer fold 0-1-2-3
0-1 = sleeve length(9cm)
0-2 = ¼ chest(15.75cm)
Square down from 2 to3
3-4 = 1.5cm
Join 0-4
Shape front and back scye depth
Gather at the hem line, using slash and spread method.

Removable fabric panel:

Length = 1/4 chest+8cm(23.75cm)
Width = 10cm



Construction lines:

- Separately join front and back part of two layers of bodice part, right side facing.
- Join side seam separately for two layers
- Place double layers of garment wrong side facing
- Attach sleeve between two layers using plain seam
- Finish neck line and front opening
- To adjust girth measurements, two rows of press buttons are used
- Finish bottom line
- To adjust length of the garment, removable fabric panel is used at the hem line using button and button holes.

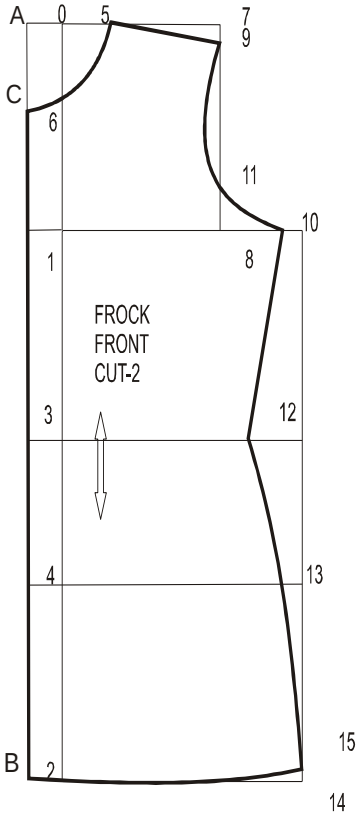
A line frock - style II

In the A line frock, sky blue (PLATE IX-CF_5**)** and pink (PLATE X-CF_6) colors of fabrics are used for double layers and reversibility. To adjusting the length of the

garment, pleated extra fitting is used. The fitness of the garment can be adjusted using elastic band(PLATE XII-Length and fit adjustable features). The traditional kasuti and kamalkhadai embroidery gave attractive look to the garment (PLATE XI-Embroidery work). Cap sleeve is also attached at the arm scye of the garment.

Measurements:

Chest round	– 63cm
Waist round	–58cm
Hip round	– 72cm
Waist length	– 28cm
Front neck depth	– 11cm
Back neck depth	– 9cm
Shoulder to shoulder	– 27cm
Frock length (knee length+10cm)	–73cm
Sleeve length	– 9cm
Armscye round	– 32cm
Lower arm circumference	–19cm



Drafting:

Front part:

Take two layers of fabric of different colours for front, fold at A-B.

Draw line 0-1-2-3 at a distance 10cm from A-B.

0-1 = 1/4chest + 1.5cm(18.25cm)
0-3 = full length + 1.5cm(74cm)
0-3 = waist length + 1.5cm(29.5)
0-4 = waist length +10cm(38cm)
0-5 = 1/12chest + 1cm(6.2cm)
0-6 = front neck depth(11cm)

Shape front neck 4-5 as in the figure, and extend the line to C.

0-7 = 1/2 shoulder + 1cm(14.5cm)

Square down from 7-8

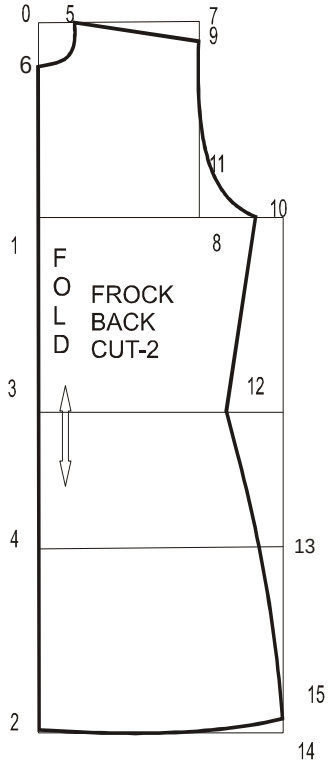
7-9 = 1.5cm

Join 4-8

10-1 = 1/4chest + 4cm(19.75cm)
11-8 = 2.5cm

Shape scye 8,10,9

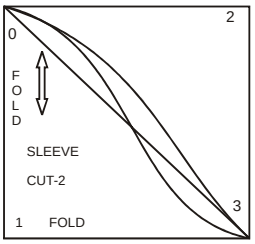
12-3 = 1/4waist round + 4cm(18.5cm)
13-4 = 1/4 hip round + 4cm(22cm)
14-2 = same as 10-1+4cm(23.5cm)



15-14 = 1.5cm
Shape bottom15-2

Back part:
Take two layers of fabric of different colours for back part with fold at 0-2.
0-6 = back neck depth(9cm)
Shape neck 4-5.
Except 11, the proportions of points 6-13 are the same as front.
Shape scye 9-11-10.

Cap sleeve:
Draw diagram on eight layer fold 0-1-2-3
0-3 = sleeve length(9cm)
0-4 = ¼ chest(15.75cm)
Square down from 2 to3
Join 0-3
Shape front and back scye depth



Construction lines:

- Separately join front and back part of two layers of fabric, right side facing.
- Join side seam separately for two layers
- Place double layers of garment wrong side facing
- Attach sleeve between two layers using plain seam
- Finish neck line and front opening
- Attach elastic band at chest line and waist line between front opening and side seam to adjust girth measurements
- Finish bottom line
- To adjust length of the garment attach separate pleat panel at hem line using velcro.

Additional features:

Embroidery work on both side of the garment, to enhance the look of the garment.

Plain frock with raglan sleeve

In this frock, reversible fabric of red and black checks (PLATE XIII-CF_6) and (PLATE XIV-CF_7) is used. Boat neck and raglan sleeve gave new look to the garment. Elastic band used for adjust the fitness of the garment and using velcro,

investigator adjust the length of the garment(PLATE XVI-Length and fit adjustable features).

Measurements:

Chest round	– 63cm
Front neck depth	– 11cm
Back neck depth	– 9cm
Shoulder to shoulder	– 29cm
Full length (knee length+10cm)	–73.5cm
Sleeve length	– 9cm
Armscye round	– 32cm
Lower arm circumference	–19cm

Drafting:

Front part:

Take two layers of fabric of different colours for front and back, fold at 0-2.

1-0 = 1/4chest + 1.5cm(18.25cm)

2-0 = full length + 1.5cm(74cm)

3-0 = 1/12chest + 1cm(6.2cm)

4-0 = front neck depth(11cm)

Shape front neck 3-4

5-0 = 1/2 shoulder + 1cm(14.5cm)

Square down from 5-6

5-7 = 1.5cm

Join 3-7

8-1 = 1/4chest + 4cm(19.75cm)

9 square down from 8.

2-10 = same as 8-1+ 4cm (23.5cm)

Join 8-10

10-11 = 1.5cm

Shape bottom11-2

12-7 = sleeve length (9cm)

12-13 = 1/2 lower arm circumference

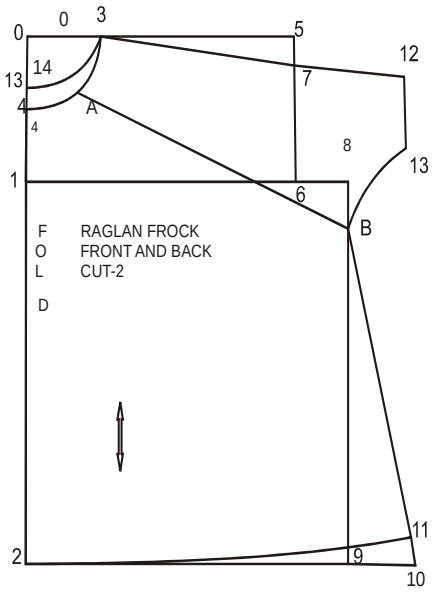
A is the point half way between 3-4

8-B = 5cm

Join A-B

Shape 13-B, as in the figure

Cut through A-B for raglan sleeve



Back part:

0-14 = back neck depth (9cm)

Shape neck 13-3

Elastic band

Length = waist round(58cm)

Width = 5cm

Construction lines:

- Take a reversible fabric which has no right or wrong side
- Join sleeve part and front bodice at A-B,using flat fell seam
- Join back bodice and sleeve part as front part
- Finish neck line using shaped facing
- Join side seam of bodice and sleeve using flat fell seam
- To adjust the fit of the garment, an elastic belt on waist line is used
- To adjust the length by using velcro attachments.

Summer frock – style II

In this frock, synthetic fabrics namely white dotted print (PLATE XVI-SF_1**)** and white abstract prints (PLATE XVII-SF_2) are used. Extensible shoulder strap is used to adjust the length of the garment and for fitness four rows of elastic bands for fitness are used(PLATE XVIII-Length and fit adjustable features).

Measurements:

Full length = 72cm

Chest round = 63cm

Drafting:

Take four layers of fabric of different colours with fold at 0-1

0-1 = full length-1/4 chest (56.25cm)

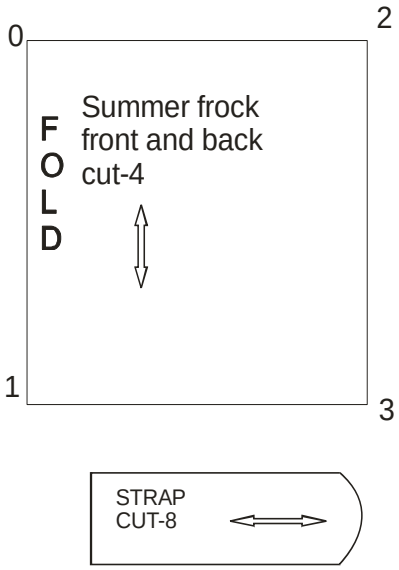
0-2 = 1/2 chest(31.5cm)

3 is square down from 2

1-3 = same as 2-1

Construction lines:

- For front part, place two layers of fabric of different colours, right side facing
- Join top and bottom line from 0-2 and 1-3 using plain seam and turn it out
- Made 8 rows of stitches at a distance of 2cm
- Insert 4 rows of ¼ inch elastic through simultaneous stitch rows to adjust fit of the garment
- For back part, do same as front
- Join side seam using flat fell seam
- Attach strap, 1/6 chest away from 0
- Strap helps to adjust the length of the garment
- Double layers on front and back made the garment reversibl

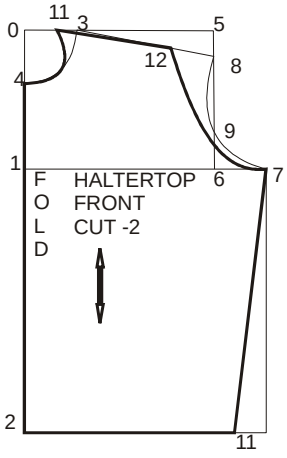


Umbrella frock with halter top

In this frock, yellow (PLATE XIX-BF_1) and blue (PLATE XX-BF_2) terry cotton fabrics are used as double layers. To adjust the length of the garment gathers at the bottom is used. For fitness elastic band is used at the back side of the top (PLATE XXI-Length and fit adjustable features). Appliqué added more attraction to the garment.

Measurements:

Chest	– 63cm
Waist length	– 28cm
Waist round	– 58cm
Front neck depth	– 11cm
Back neck depth	– 9cm
Shoulder to shoulder	– 27cm
Full length	–72.5cm
(knee length+10cm)	
Sleeve length	– 9cm
Armscye round	– 32cm
Lower arm circumference	–19cm

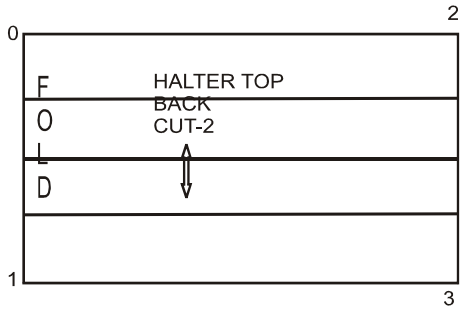


Drafting:

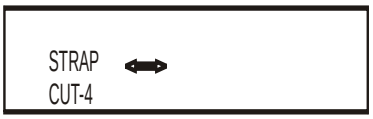
Halter top

Front part:

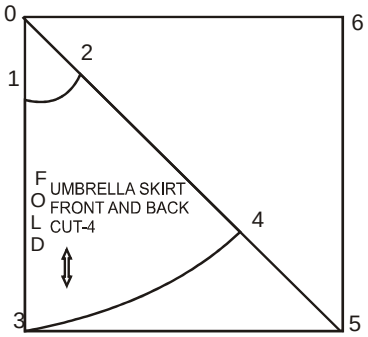
Take two layers of fabric of different colours, for front part.



0-1 = ¼ chest(15.75cm)
0-2 = waist length +1cm(29cm)
Square down from 0-1-2
0-3 = 1/12chest(5.2cm)
0-4 = front neck depth(11cm)
0-5 = ½ shoulder +1cm(14.5cm)
6 is square down from 5
7-1 = ¼ chest + 4cm (19.75cm)



8-5 = 1.5cm
9-6 = 2.5cm
Shape front armhole
10-2 = ¼ waist round + 4cm (11cm)
11-3 = 3cm
12-11 = 4cm
Shape 11-4 for front neck
Shape arm scye 12-7 as in the figure.



Back part:
Take two rectangle piece of different colours
Length = waist length- 1/4chest (12.25cm)
Width = chest round (63cm)
Strap:
Length = 30cm
Width = 3cm

Construction lines:
Front and back bodice

- Place two layers of front bodice of different colours , right side facing
- Join the layers at 4,11,12,7 and 10, the shape as in the figure, turn it out.
- Place two layers of back bodice, right side facing
- Join the layers at 0-2, with plain seam and turn it out
- Made six rows of stitches at a distance of 2cm
- Insert ¼ inch elastic through the stitch rows, for adjusting the girth measurements
- Attach straps at both sides of front neck, at 11-12. Strap helps to adjust the length of the garment

For skirt part:
Draw diagram on an eight layer fold.
Square lines from 0
1-0 = 1/4 waist + 2.5cm(17cm)
Shape 1-2 with radius is same as 1-0
3-1 = frock length + 1cm(73.5cm)

Shape 3-4 with radius 0-3

Construction lines:

- Place front bodice between double layers of front skirt part, right side facing
- Join four layers at the waist line using plain seam
- Join back part the same way
- Join side seam using flat fell seam
- Finish the hem line using gathered panel.

Additonal features:

Gathers at the bottom of the skirt and appliqué at the bodice part give attractive look to the garment.

3.9.EVALUATINGTHE CONSTRUCTED FROCK STYLES WITH VARIATIONS

In order to evaluate the constructed frock styles, 20 visually challenged grade school girls, 25 home makers and 25 PG students mastering Textiles and Clothing from Avinashilingam Deemed University, Coimbatore were selected. The selected subjects were asked to wear frocks. A Performa(Appendix-X) was prepared by the investigator and requested selected subjects to express their views about comfort, easy to wear, fitness, able to identify the work and texture of the frock styles. The home makers were asked to express their views about general appearance, texture, color combinations,style, reversibility and adjustability of the garment by using already prepared evaluation Performa (Appendix- XI).

The selected 25 PG students were also requested to evaluate the frock styles using already framed questions with respect to Performa (Appendix-XII) ease, grain, balance, set, line, general appearance, reversibility, adjustability, suitability, color combinations and choice of decorations.

The data thus consolidated were consolidated, analyzed systematically and represented in the chapter Result and Discussion. With regard to cost calculation of each and every items of frocks the textile experts and home makers were highly satisfied and appreciate the choice of materials, adjustable features, reversible style and surface decorative of the garment. Cost sheet of constructed garments is given in Appendix XIII.

PLATE II – CF_1

PLATE III– CF_2

PLATE IV –Fabric Painting

PLATE V- Length and fit adjustable features

PLATE VI-CF_3

PLATE VII –CF_4

PLATE VIII- Length and fit adjustable features

PLATE IX - CF_5

PLATE X-CF_6

PLATE XI – Embroidery work

PLATE XII-Length and fit adjustable features

PLATE XIII-CF_7

PLATE XIV – CF_8

PLATE XV-Length and fit adjustable features

PLATE XVI-SF_1

PLATE XVII- SF_2

PLATE XVIII-Length and fit adjustable features

PLATE XIX – BF_1

PLATE XX – BF_2

PLATE XXI – Length and fit adjustable features

RESULTS AND DISCUSSION

4. RESULTS AND DISCUSSION

The findings of the study are discussed under following headings.

4.1 Evaluation of survey

4.1.1 General information

4.1.2 Detailed information regarding the garment

4.2 Evaluation of designs

4.3 Evaluation of muslin pattern

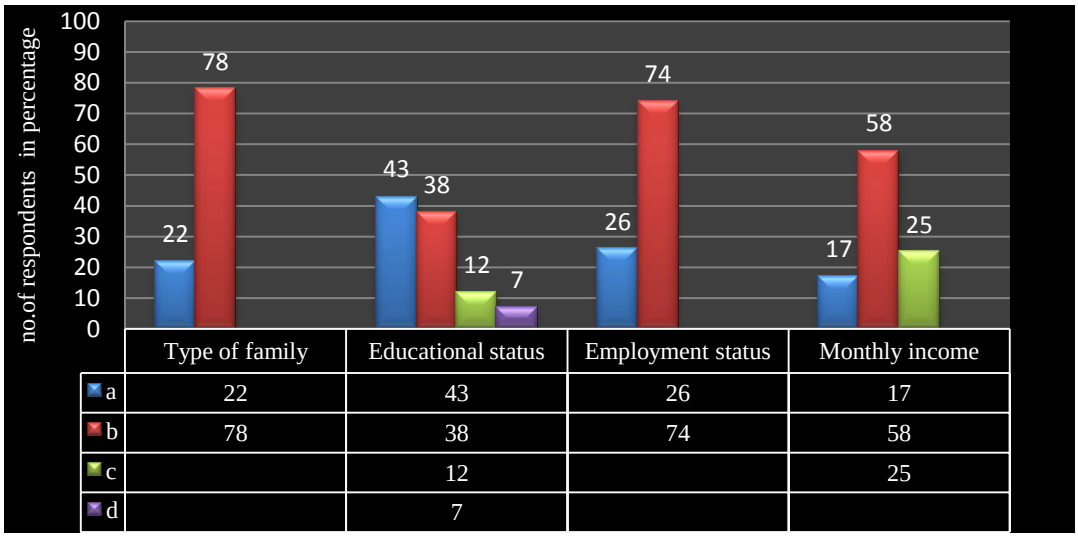
4.4 Evaluation of constructed reversible and adjustable garments

4.1 Evaluation of survey

The result of the survey furnish the information on type of material, style of the garment, texture of the fabric, design, colors, self helping features, functional and decorative features by visually challenged grade school girls.

4.1.1 General information

General informations include type of the family, educational status, employment status of mothers, monthly income of the family, age of visually challenged grade school girls, state of blindness, person responsible, type and frequency of purchasing of clothing, place of purchase and factors influencing the purchase of clothing is presented in the figure-II, III,IV,V.



Type of family	Educational status	Employment status	Monthly income(in rupees)
a – Joint	a – SSLC	a – Employed	a – Up to 5000
b – Nuclear	b – Higher secondary	b – Unemployed	b – 5000-10000
	c – Under graduates		c – Above 10000
	d – Post graduates		

Information on background of selected family

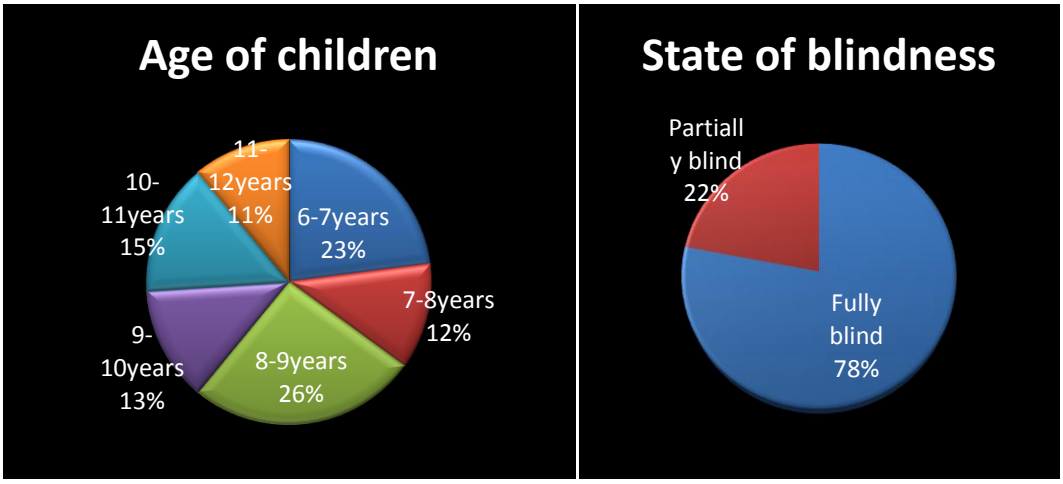
Figure – II

The results of the survey proves 78 and 22 per cent belonged to the joint family system. The educational status of the selected families reveals 7 per cent of homemakers as post graduation, 12 per cent as under graduation, 38 per cent with higher secondary level and the rest 43 percent with SSLC.

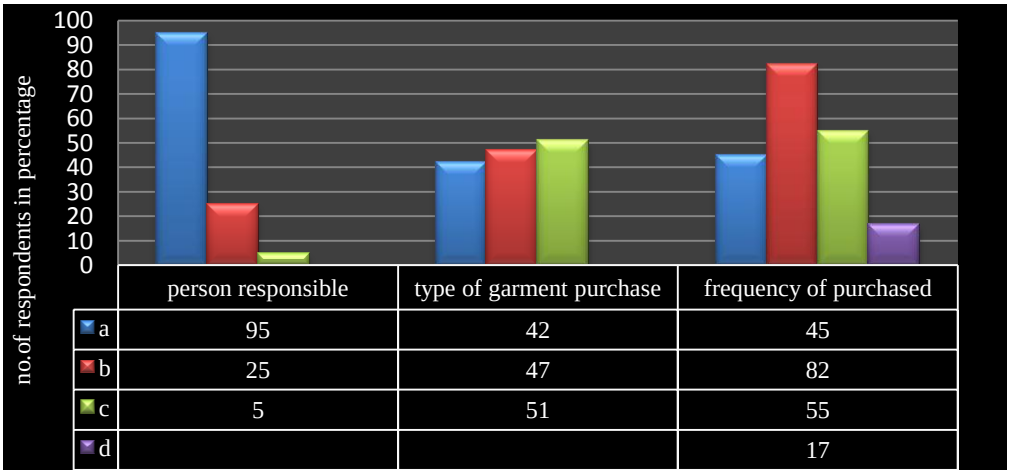
Regarding the employment status of the homemakers, the study unfold the fact that 26 per cent were employed and 74 per cent of the home makers were unemployed. With reference to the monthly income, among the selected families 17 per cent of the families belonged to low income, 58 per cent of the families belonged to middle income, and rest belonged to high income category.

From the Figure- III, it is clear that the maximum and minimum number of visually challenged grade school girls, 26 and 11 percent were found in the age between 8-9years and 11-12 years respectively. With regard to state of blindness, 78 per cent of

children were fully blind and 22 per cent were partially blind. Hence it is clear that 78%of sample required maximum help in grooming themselves.



Information on age of children and state of blindness
Figure-III



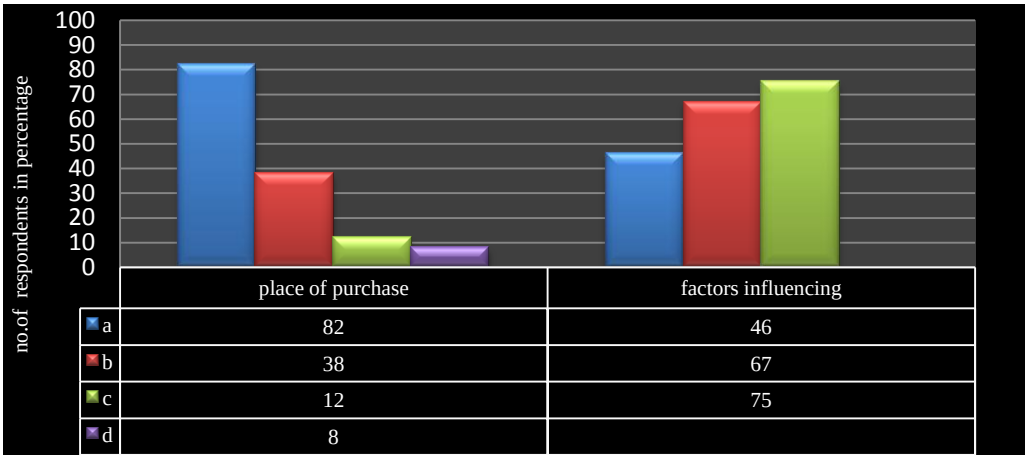
Person responsible	Type of garment purchase	Frequency of purchase
a- mother	a-ready made	a-during festivals and celebrations
b- father	b-home made	b-as and when required
c-other	c-tailor made	c-during discount sales
		d-once in a year

Details on place of purchase and responsible towards different climatic conditions
Figure-IV

From the Figure-IV, it is noted that, among the selected families, 95,35,2 and 3 per cent of the home makers, head of family, sibling and grandparents took care of purchasing clothes respectively. From the survey results it is also obvious that visually challenged grade school girls were unable to select their dresses unlike other girls of the same group.

Regarding type of clothes purchased, 42 per cent of home makers preferred readymade garments, 47 per cent preferred garments stitched at home and 51 per cent of home makers went for tailor made garments for their visually challenged grade school children.

It is also found that 45 per cent of home makers purchased their clothing items during festivals and celebrations where as 82 per cent purchased their clothes as and when required and 17 per cent purchased once in a year. Fifty five per cent of families concentrate their purchase pattern of their clothes during discount sales.



Place of purchase	Factors influencing purchasing
a-any shop	a-climate
b-retail shop	b-purpose
c-wholesale shop	c-cost of garment
d-particular shop	

Details on place of purchase and factors influencing purchase

Figure-V

From the Figure-V it is clear that 82per cent of home makers brought their clothing items from any shop, while 12 per cent purchased their clothing items in nearby whole sale shop and 38 per cent of families purchased their garments from retail shops. Preference of specific shops was expressed by 8 percent of the home makers. According to survey, 46 per cent of the families consider the climatic condition before choosing the material, where as 67 and 75 percent of the home makers consider purpose and cost as the major factor governing purchase of clothes for visually challenged grade school girls.

4.1.2 Details regarding the garment.

The details on type and texture of material preferred by selected families given in Table-IV and figure-VI.

Table – IV

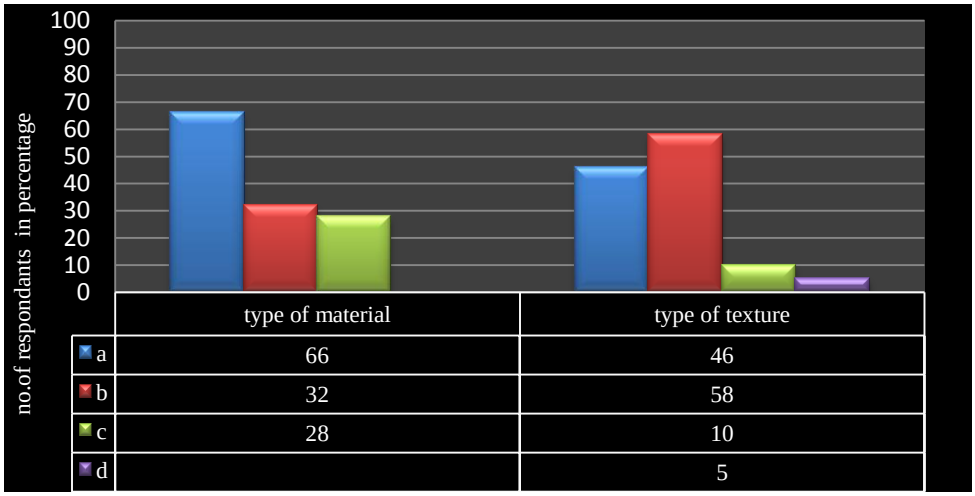
Information on type and texture of material preferred in the selected families

S.No	Particulars	Percentage
1	Type of material*	
	a. cotton	66
	b. synthetic	32
	c. wool	0
	d. blended	28
	Total	126
2	Type of texture*	
	a. soft	46
	b. medium	58
	c. rough and coarse	1
	d. slippery	4
	Total	109

*multiple responses

From the above table it could be confirmed that 66, 32 and 28 percent of homemakers preferred cotton, synthetic and blended fabrics for their grade school girl's apparels respectively. With reference to texture 58 and46 percent of the mothers choose

medium and soft textured fabrics for their visually challenged grade school girls dresses respectively. Hence it could be concluded that medium and soft textured fabrics are best preferred for visually challenged grade school girls.



Type of material	Type of texture
a-cotton	a-soft
b-synthetic	b-medium
c-blended material	c-course and rough
	d-slippery

Details on type of material and type of texture

Figure-VI

The details on the garment, style and factors influencing their choice is given in the Table -V and Figure-VII.

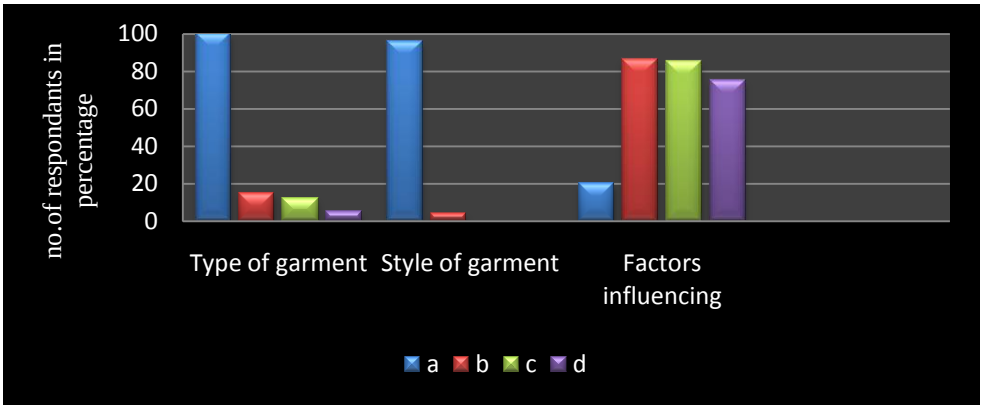
Table V and figure VII indicate frocks as the most preferred garments for their visually challenged grade school girls but some of them were also interested in middy and middy tops, salwar- kameez and pant and shirt. According to the survey, 96 per cent preferred snug fitting and four per cent preferred loose fitting garments for their visually challenged grade children. As per the factors affecting selection of garments comfort, easy to wear, durability and suitability was expressed by eighty six, eighty five, seventy five and twenty per cent of the visually challenged grade school girls.

Table- V

Details on the type, style and factors influencing their choice of the garment

S.No	Particulars	Percentage
1	Type of garment* a. frock b. middy and middy top c. salwar and kameez d. pant and shirt	 100 10 2 3
	Total	115
2	Style of garment a. loose fitting b. tight fitting c. snug fitting	 4 0 96
	Total	100
3	Factors influencing* a. suitability b. comfortable c. easy to wear d. durability	 20 86 85 75
	Total	266

*multiple responses



Type of garment	**Style of garment**	**Factors influencing their purchase**
a-frock	a-snug fitting	a-suitability
b-middy middy top	b-loose fitting	b-comfortability
c-salwar-kameez		c-easy to wear
d-pant and shirt		d-durability

Details on type, style of the garment and factors influencing their purchase

Figure-VII

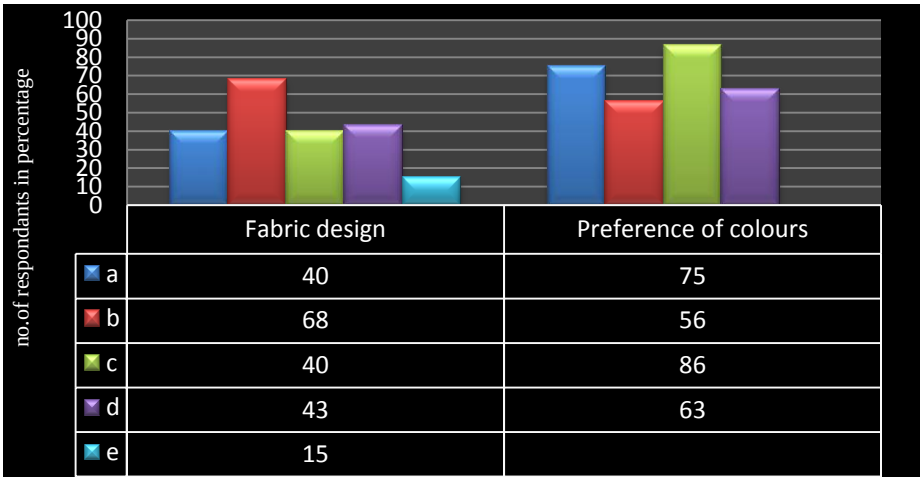
Details on preferred fabric design and colour combination is given in the Table –VI and Figure VIII.

Table-VI

Details on preferred fabric design, colour combination

S.No	Details	Percentage
1	Preference of fabric design*	
	a. prints	40
	b. plaids	68
	c. stripes	40
	d. dots	43
	e. plain	15
	Total	206
2	Preference of colours*	
	a. light shades	75
	b. dark shades	56
	c. medium shades	86
	d. deep shades	63
	Total	276

*multiple responses



Fabric design	**Preference of colors**
a-prints	a-light shade
b-plaids	b-dark shade
c-stripes	c-medium shade
d-dots	d-deep shade
e-plain	

Preference on fabric design and colour combination
Figure-VIII

With regard to fabric design 40 per cent preferred different types of printed fabrics for their visually challenged grade school children where as 68,40, 43 and 15 per cent preferred plaids, stripes, dots and plain fabric with surface enrichments respectively. The above Table-VI indicates 86 and 75 per cent of mothers preferred medium shades and light shades respectively. Apart, 56 and 63 per cent preferred dark and deep shade colours for their visually challenged grade school girls. Hence it could be concluded that medium shades are best choice for visually challenged grade school girls.

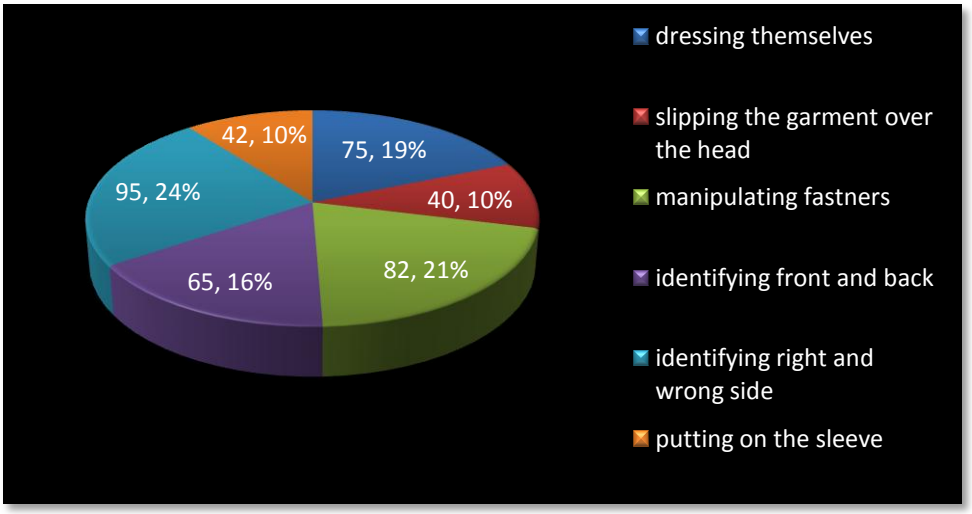
Details on types of help needed for putting on and taking off the garment for visually challenged grade school girls are given in Table-VII and Figure-IX.

Table- VII

Details on type of help needed for wearing garments

S.No	Particulars	Percentage
1	Types of help needed*	
	a. dressing themselves	75
	b. slipping the garment over the head	40
	c. manipulating fastners	82
	d. identifying front and back	65
	e. identifying right and wrong side	95
	f. putting on the sleeve	42
	Total	399

*number exceeds due to multiple responses



Details on type of help needed for wearing garments
Figure-IX

From the TableVII and Figure IX, 75,40,82,65,95 and 42 per cent of visually challenged grade school girls need help for dressing themselves the garment, slip on the garment over the head, manipulating fastners, identifying front and back side of the garment, identify right and wrong side of the garment, putting on the sleeve of the garments respectively. This also shows the importance of reversible garments for visually challenged grade school girls.

Details on life time and reason for short life time of the garment is presented in Table-VIII and Figure-X.

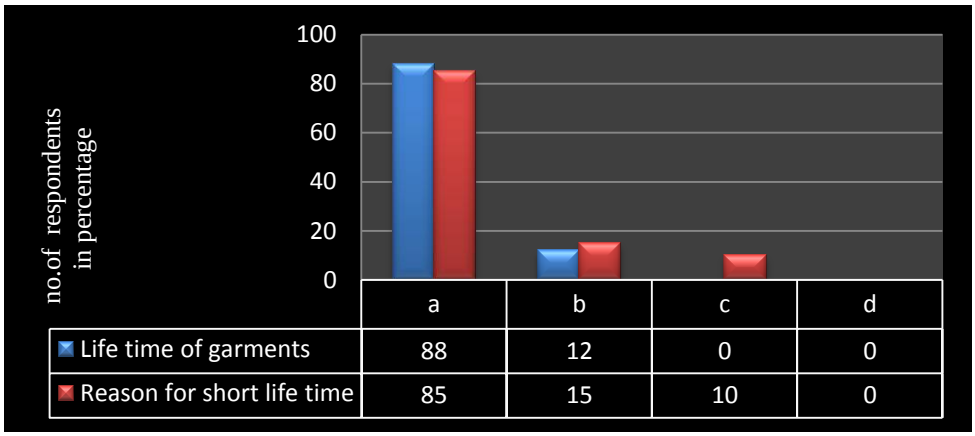
Table-VIII

Details on life time and reason for short life time of garments

S.No	Details	percentage
1	Life time of garments	
	a. one year	88
	b. two years	12
	c. three years	0
	d. more than three years	0
	Total	100
2	Reason for short life time*	
	a. growth of child	85
	b. garments become odd look	15
	c. other	10
	Total	110

* multiple responses

Table-VIII and Figure-X reveal the durability of the garments as 88 and 12 per cent use garment maximum for one and two years respectively. According to 85 per cent of mothers, the main reason for short life time of garments is growth of children and 15 per cent expressed old look to reduce the life time of the garment. Ten per cent expressed other reasons such as quality of the material. Hence it could be concluded that adjustable garments for grade school girls increase the life time of garments.



Life time of garments	Reason for short life time
a.one year	a.growth of child
b.two years	b.garments become odd look
c.three years	c.other
d.more than three years	

Details on life time and reason for short life time of garments

Figure-X

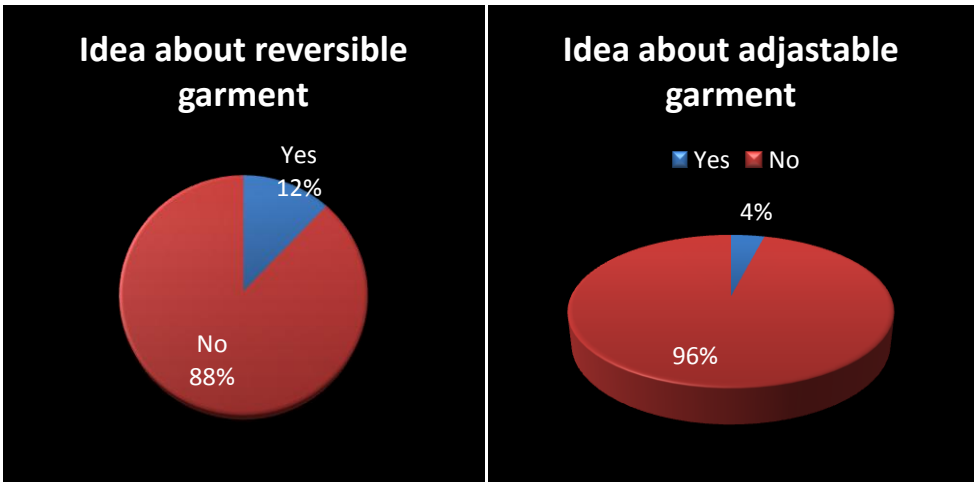
Details of knowledge about reversible and adjustable garments is given in Table- IX and Figure- XI.

Table-IX

Knowledge about reversible and adjustable garments

S.No	Details	Percentage
1	Idea about reversible garments a. yes b. no	 12 88
	Total	100
2	Idea about adjustable garments a. yes b. no	 4 96
	Total	100

From the Table-IX and Figure-XI, it is clear that 88 per cent of mothers have no idea about reversible and 96 percent have no idea about adjustable garments.



Knowledge about reversible and adjustable garments
Figure-XI

Details on type of placket opening, type of fastners were given in the Table – X and Figure-XII.

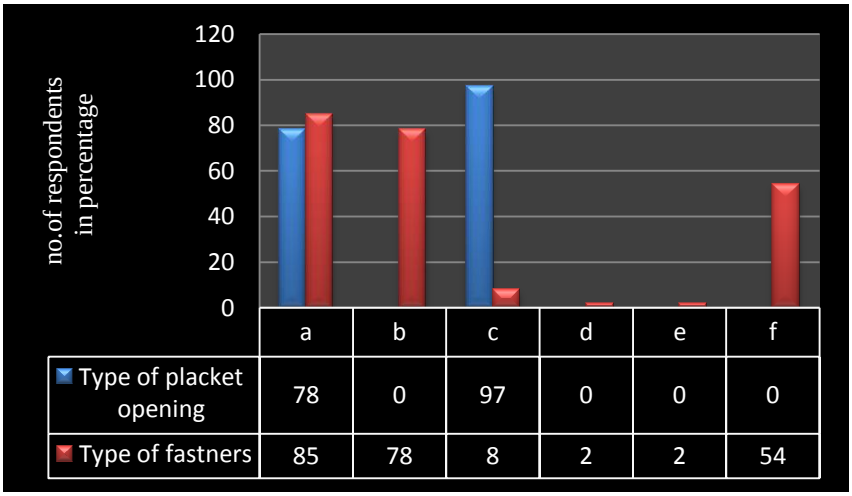
Table-X
Details of type of placket opening and fastners

S.No	Partculars	Percentage
1	Type of placket opening*	
	a. front opening	78
	b. back opening	0
	c. without opening	97
	Total	175
2	Type of fastners*	
	a. elastic	85
	b. buttons	78
	c. zippers	8
	d. hook and eye	2
	e. loops	2
	f. Velcro	54
	Total	229

*multiple responses

The data gathered from the survey revealed that 97 per cent of home makers preferred garments without any opening which was more comfortable for their visually challenged

grade school children. Eighty five percent and 78 per cent preferred elastic and buttons as fastners respectively where as 54 per cent of home makers expressed velcro as their next priority. Hence it could be concluded that elastics, buttons, and velcro are suitable fastners for visually challenged grade school girls.



Type of placket opening	Type of fastners
a.front opening	a.elastic
b.back opening	b.buttons
c.without opening	c.zippers
	d.hook and eye
	e.loops
	f.Velcro

Details of type of placket opening and fastners

Figure-XII

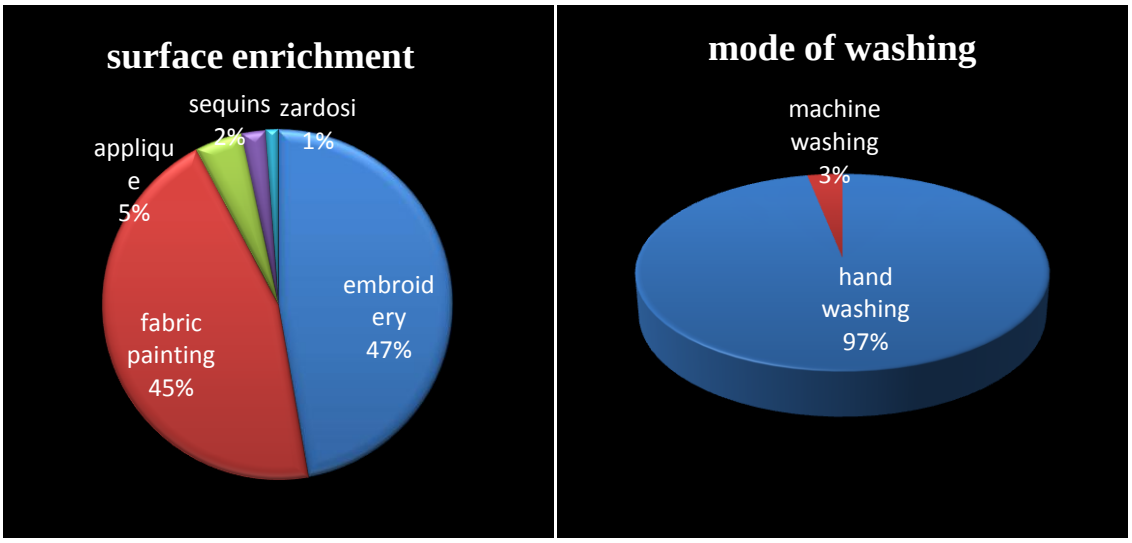
From the Table-XI, It is interesting to note that majority of home makers preferred some type of surface enrichment along with frocks. Among different types of decoration, 82 and 86 per cent preferred embroidery and fabric painting as their choice of decoration for their visually challenged grade school girls. Since it is more comfortable for reversible garment. With regard to mode of washing, 98 per cent of home makers preferred hand washing and 12 per cent use washing machine for washing garments. Hence it could be concluded that embroidery and fabric painting are best choice for visually challenged grade school girls.

Table-XI

Details on surface enrichment and mode of washing

S.No	Details	Percentage
1	Surface enrichment*	
	a. Embroidery	82
	b. Fabric paint	86
	c. Appliqué work	8
	d. Sequins work	4
	e. zardosi	2
	Total	182
2	Mode of washing*	
	a. hand washing	98
	b. machine washing	12
	Total	110

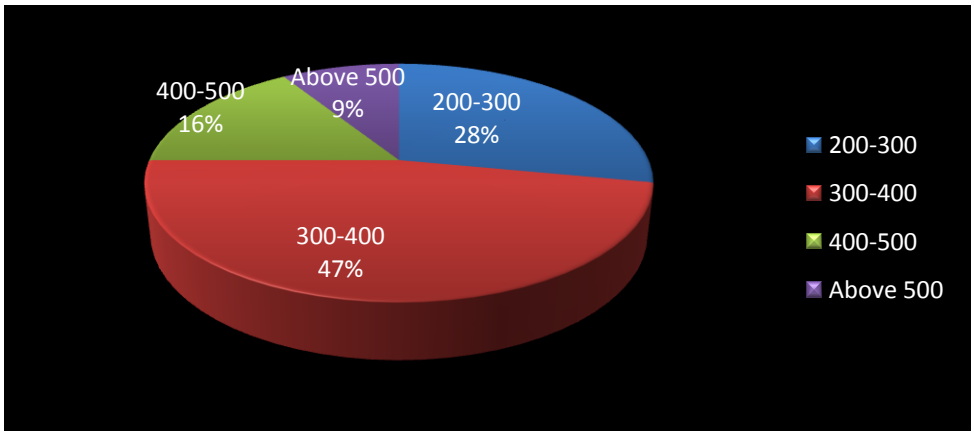
*multiple responses



Details on surface enrichment and mode of washing
Figure-XIII

Details on amount ready to spend for casual wears for their visually challenged grade school girls is given in Figure- XIV.

From the Figure XIV,it is clear that 28 per cent of families were ready to spent rupees 200-300 for casual wears,47 per cent spent rupees between 300 and 400, 16 per cent ready to spent rupees between 400 and 500. Nine percent of family ready to spent above 500 rupees for casual wears of their visually challenged grade school girls.

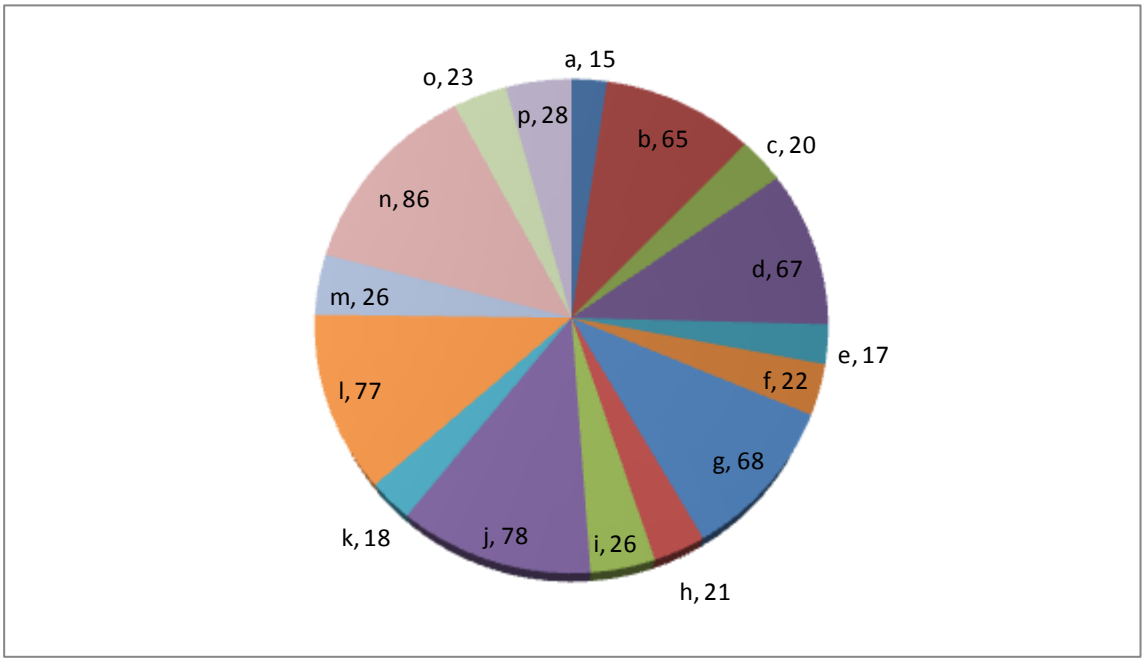


Details on amount spend for casual wears

Figure-XIV

4.2 Evaluation of sketched designs

Based on clothing requirements and suggestions by the respondents, 15 designs were prepared by the investigator which was focussed on blindness of grade school girls. The designs were developed keeping in mind that their limitations as shown in the Figure-XV.



Details on evaluation of Designs in percentage

Figure – XV

4.3 Evaluation of the muslin frock

The result of the fit of the muslin pattern is presented in the Table-XII.

Table-XII

Evaluation of the muslin frock by visually challenged grade school girls and PG students

N=70

S.No	Aspects	By visually challenged grade school girls		By students	
		Satisfactory(in percentage)	Not satisfactory (in percentage)	satisfactory (in percentage)	Students (in percentage)
A	**Frock**				
1	Chest girth	100	-	100	-
2	Waist girth	100	-	100	-
3	Hip girth	99	1	95	5
4	Shoulder to shoulder	100	-	98	2
5	Front neck girth	100	-	100	-
6	Back neck girth	100	-	100	-
7	length Frock length	97	3	96	4
B	**Sleeve**				
1	Armscye round	100	-	100	-
2	Lower arm circumference	100	-	99	1
3	Half sleeve length	99	1	100	-
C	**Additional features**				
1	Length adjustable features	100	-	100	-
2	Girth adjustable features	100	-	100	-

From the above Table-XII, it was clear that muslin frock except frock length, hip girth measurements and sleeve length, all other measurements were rated as satisfactory by 100 per cent of visually challenged grade school girls, and frock length was also rated as satisfactory by 97 percent, sleeve length and hip girth was satisfactory by 99 per cent.

It was noted that muslin frock except frock length, hip girth measurements, shoulder to shoulder, and lower arm circumference, all other measurements were rated as

satisfactory by 100 per cent of the PG students. Frock length was rated as satisfactory by 96 percent; hip girth was satisfactory by 95 per cent. Shoulder to shoulder and lower arm circumference were also rated as 98 and 99 per cent respectively.

4.4 Evaluation of constructed frock styles with variation

4.4.1 Evaluation of constructed frocks with variations by the visually challenged grade school girls.

The constructed frocks were evaluated by the selected 20 visually challenged grade school girls is given in the Table- XIII.

Table – XIII

Evaluation by the visually challenged grade school girls

S.No	Outfit	Comfort			Easy to wear			Fitness			Able to identify the work			Texture		
		Good	Fair	Poor	Good	Fair	poor	good	fair	poor	easy	difficult	Not able to find	good	fair	poor
1	CF_1	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
2	CF_2	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
3	CF_3	98	2	-	100	-	-	100	-	-	100	-	-	100	-	-
4	CF_4	98	2	-	100	-	-	100	-	-	100	-	-	100	-	-
5	CF_5	100	-	-	100	-	-	98	2	-	100	-	-	100	-	-
6	CF_6	100	-	-	100	-	-	98	2	-	100	-	-	100	-	-
7	CF_7	100	-	-	100	-	-	100	-	-	99	1	-	100	-	-
8	CF_8	100	-	-	100	-	-	100	-	-	99	1	-	100	-	-
9	SF_1	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
10	SF_2	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
11	BF_1	100	-	-	100	-	-	100	-	-	100	-	-	99	1	-
12	BF_2	100	-	-	100	-	-	100	-	-	100	-	-	99	1	-

The Table-XIII clearly shows evaluation of the six varieties of frocks made of cotton, synthetic and blended materials. Among the different styles CF_1,CF_2, SF_1, SF_2 were expressed as highly satisfactory by the selected visually challenged grade school girls.

4.4.2 Evaluation of constructed frocks with variations by home makers

The evaluation of constructed frocks with variations by home makers is given in Table- XIV.

Table – XIV

Evaluation by homemakers

S.No	Outfit	General appearance			Texture			Colour combination			Reversible and adjustable features			Style		
		Good	Fair	Poor	Good	Fair	poor	good	fair	poor	easy	difficult	Not able to find	good	fair	poor
1	CF_1	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
2	CF_2	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
3	CF_3	100	-	-	100	-	-	99	1	-	100	-	-	100	-	-
4	CF_4	100	-	-	100	-	-	99	1	-	100	-	-	100	-	-
5	CF_5	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
6	CF_6	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
7	CF_7	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
8	CF_8	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
9	SF_1	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
10	SF_2	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
11	BF_1	100	-	-	100	-	-	100	-	-	99	1	-	100	-	-
12	BF_2	100	-	-	100	-	-	100	-	-	99	1	-	100	-	-

The Table-XIV reveals the six varieties of frocks made of cotton, synthetic and blended material and their evaluation. Among the different styles CF_1, CF_2,CF_5,CF_6,CF_7,CF_8, SF_1, SF_2 were expressed as 100 per cent satisfactory by home makers.

4.4.3 Evaluation of constructed frocks with variations by PG students

The evaluation of constructed frocks with variations by 25 PG students, mastering from textiles and clothing department, avinashilingam deemed university, is given in Table- XV.

Table-XV

Evaluation of frocks by PG students

S no	Outfit	Ease			Grain			Line			Balance			Set			General appearance			Style			Colour combination		
		Correct	Loose	Tight	Good	Fair	poor	Smooth	Fairly smooth	Not smooth	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
1	CF_1	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
2	CF_2	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
3	CF_3	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	99	1	-
4	CF_4	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	99	1	-
5	CF_5	100	-	-	100	-	-	99	1	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
6	CF_6	100	-	-	100	-	-	99	1	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
7	CF_7	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	99	1	-	100	-	-	100	-	-
8	CF_8	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	99	1	-	100	-	-	100	-	-
9	SF_1	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
10	SF_2	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
11	BF_1	98	2	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-
12	BF_2	98	2	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-	100	-	-

The Table-XV reveals that 100 per cent of PG students, mastering from Textiles and Clothing Department, Avinashilingam Deemed University, were highly satisfactory with regard to grain, balance, set, style of the garment. Among the six varieties of frocks made of cotton, synthetic and blended material CF_1, CF_2,CF_5, CF_6,CF_7, CF_8, SF_1, SF_2 were expressed as 100 per cent satisfactory by PG students with respect to various parameters considered for evaluation.

SUMMARY AND CONCLUSION

SUMMARY AND CONCLUSION

Children are wealth of nation. Children of today are citizens of tomorrow. The role of children cannot be neglected in the building of nation. They are future handlers of nation. In India, as per the census 2010, about five percent of grade school girls between 5-15 years old suffer from visual disability. Garment designing for visually challenged grade school girls was taken up particularly because there are many NGOs working for boys, a general observation is that visually challenged girls tend to be neglected, parents also find it cumbersome to assist them and therefore it is social necessity to design functional garments which encourage them and adding their self confidence.

The main objectives of the study are:

- To gather information on the preference of clothing requirement by visually challenged grade school girls and their care takers.
- Standardizing the body measurements for visually challenged grade school girls.
- To create adjustable and reversible garments for visually challenged grade school girls.
- To find the suitability, acceptability and evaluation of constructed garments.

Since the study was based on visually challenged grade school girls three blind schools were chosen and based up on their willingness to interact the investigator selected 100 visually challenged grade school girls and their mothers to conduct the survey, to collect information about choice of dresses, fabric, texture, type of material, style, color combinations, surface enrichments preferred by them for their reversible and adjustable garments. In order to standardize the body measurements required to design and construct garments 100 visually challenged grade school girls between the age group 6-12 years were selected.

The person to be measured was made to stand erect in a natural pose and the following body measurements, chest girth, waist girth, hip girth, shoulder to shoulder,

waist length, front neck depth, back neck depth, knee length, arm scye round, lower arm circumference, half sleeve length were taken by the investigator. These measurements were standardized using mode formula,

$$M_O = L + \frac{\Delta 1}{(\Delta 1 + \Delta 2)} \times i$$

Where L is the lower limit of the modal class, Δ_1 is the difference between the frequency of modal class and pre modal class, Δ_2 is the difference between modal class and post modal class and I is the class interval of the modal class.

Based on the survey result it was found that majority of children preferred frocks. Therefore investigator sketched sixteen designs for frocks. These designs were rated by mothers and best six designs were selected for the study. The investigator review number of instructions for selected frock styles and developed new instructions. Based upon these instructions paper patterns were developed. Following the principles of fabric preparation, straightening, transferring the patterns, marking, cutting and sewing muslin patterns were prepared using muslin fabric.

The constructed muslin patterns were tried in visually challenged girls with standardized body measurements for comfort, fit, ease and balance. Required changes were made on instructions were further modified to suit the selected garments.

Summer frock – style I

Since the variation is a reversible garment, two color combinations of fabrics, magenta (**CF_1**) and violet (**CF_2**) are used. In the summer frock, the length of the garment can be adjusted using press buttons at shoulder straps. The fitness of the garment can be adjusted at the waist line using cord and to enrich the garment contrast painting is done.

A line frock - style I

Since the variation is a reversible garment, two color combinations of fabrics, white and red checks (**CF_3**) and abstract print (**CF_4**) are used. In this A line frock,

adjusting the length and fitness of the garment, using different types of buttons. Puff sleeve also attached at the arm scye of the garment.

A line frock - style II

In the A line frock, sky blue (**CF_5)** and pink (**CF_6**) colors of fabrics are used for double layers and reversibility. To adjusting the length of the garment, pleated extra fitting is used. The fitness of the garment can be adjusted using elastic band. The traditional kasuti and kamalkhadai embroidery gave attractive look to the garment. Cap sleeve is also attached at the arm scye of the garment.

Plain frock with raglan sleeve

In this frock, reversible fabric of red and black checks (**CF_6**) and (**CF_7**) are used. Boat neck and raglan sleeve gave new look to the garment. Elastic band used for adjust the fitness of the garment and using velcro, investigator adjust the length of the garment.

Summer frock – style II

Synthetic fabrics namely white dotted print (**SF_1)** and white abstract prints (**SF_2**) are used to construct the summer frock- style II. Extensible shoulder strap is used to adjust the length of the garment and for fitness four rows of elastic bands are used.

Umbrella frock with halter top

Umbrella frock (**BF_1** and **BF_2**), yellow and blue terry cotton fabrics are used as double layers. To adjust the length of the garment gathers at the bottom is used. For fitness elastic band is used at the back side of the top. Appliqué added more attraction to the garment.

The constructed frock styles were evaluated by visually challenged grade school children, their mothers and PG students, mastering Textiles and Clothing from Avinashilingam Deemed university for various aspects like comfort, appearance, fitness, easy to wear, adjustable and reversible features, style, texture, colour combination, ease, grain, set, balance and line.

Finding the study:

Based upon willingness to interact 100 visually challenged grade school girls between the age group 6-12 years were selected in which 78 children were fully blind and 22 were partially blind.

- From the survey, it is clear that 66,32, 28 percent mothers of visually challenged grade school girls preferred cotton , synthetic and blended fabrics respectively for their children.

- With reference to texture, 58 and46 percent of the mothers choose medium and soft textured fabrics for their grade school girls dresses respectively.

- Regarding the type of garment, frocks as the most preferred garments for their visually challenged grade school girls and most of them prefer snug fitted garments.

- Among the selected subjects,68, 40, 43 and 15 per cent preferred plaids, stripes, dots and plain fabric with surface enrichments respectively and 56 and 63 per cent of mothers preferred dark and deep shade colours for their visually challenged grade school girls.

- According to the survey, 75,82,65,95 percent of visually challenged grade school girls needed help for wearing garments, manipulating the fastners, identifying front and back side and identifying right and wrong side of the garment respectively.

- Eighty eight percent of home makers have no idea about reversible and 96 percent have no idea about adjustable garment.

- Ninety seven per cent of home makers preferred garments without any opening which was more comfortable for their children. Eighty five percent preferred elastic, which was maximum in usage.

- It is interesting to note that 86 per cent preferred fabric painting as their choice of decoration for their visually challenged grade school girls followed by embroidery and appliqué work. Most of the mothers were ready to spend between Rs. 300-400 for casual dress of their children.

Evaluation of muslin pattern

By visually challenged grade school girls and PG students

- Muslin frock except frock length, hip girth measurements and sleeve length, all other measurements were rated as satisfactory by 100 per cent of the subjects, and frock length was also rated as satisfactory by 97 percent, sleeve length and hip girth was satisfactory by 99 per cent.

- As per PG students, Mastering Textiles and Clothing, Avinashiligam Deemed University, muslin frock except frock length, hip girth measurements, shoulder to shoulder, and lower arm circumference, all other measurements were rated as satisfactory by 100 per cent of the subjects. Frock length, Shoulder to shoulder and lower arm circumference were also rated above 95 percent.

Evaluation of constructed frock styles with variation

- Among the different styles $CF_{1,}CF_{2,}$ $SF_{1,}$ SF_2 were expressed as highly satisfactory by the selected visually challenged grade school girls.

- Among the different styles $CF_{1,}$ $CF_{2,}CF_{5,}CF_{6,}CF_{7,}CF_{8,}$ $SF_{1,}$ SF_2 were expressed as highly satisfactory by 100 percent of home makers.

- Among the six varieties of frocks made of cotton, synthetic and blended material except $CF_{1,}$ $CF_{2,}$ $CF_{5,}$ $CF_{6,}$ $CF_{7,}CF_{8,}$ $SF_{1,}$ SF_2 were expressed as highly satisfactory by 100 percent of PG students, mastering Texiles and Clothing, from Avinashilingam Deemed University with respect to various parameters considered for evaluation.

CONCLUSION

It can be concluded that blindness extended problems in manipulation of the fastners and putting on and taking off the garments. Most of the children required help during dress up and undressing up. Immediate growth of children of this age group is another problem faced by parents. Due to growth of children durability of garments becomes reduced. Keeping in mind their problem some garments were designed with adjustable and reversible features. The innovative frock styles created were well appreciated by the selected visually challenged grade school girls as they could easily put on and take off because these garments have no right and wrong side. These garments were also well accepted by homemakers because the adjustable features increase the durability with affordable price range.

Limitations:

Due to inferiority complex visually challenged grade school girls were refused to take photographs.

Further study:

- Creating innovative garment styles for other disabled people.
- Develop garment designs for visually challenged people of other age groups.
- Creating designs for other commonly used garments like middy, middy tops, pants and ghagra choli can be worked upon.
- Developing garments designs on knitted fabrics for visually challenged children.

BIBLIOGRAPHY

BIBLIOGRAPHY

Books:

- Aldrich,W., (1990). " Metric pattern cutting for men's wear", Granade publishing Ltd., New Delhi, P.13.
- Aldrich,W.,(2004)."Metric pattern cutting for childern's wear and baby wear",Blackwell science ltd, London,1st Edition, Pp.7, 12.
- Aldrich,W.,(2003),"Metric pattern cutting", Blackwell publishing,Oxford, P.5.
- Ameden, and Crawford,C.,(1994)."The art of fashion draping",Fairchild publication, Newyork, P.151.
- Armstrong,H.J.,(2005)."Pattern making for fashion design",Pearson education(pte.)Ltd., Singapur, Pp. 28,34.
- Arora,V., (2008)."SUVASAS-The beautiful costumes, Abhishek publications, Chandigarh, P.147.
- Bansal,P.,(2008). "Elements of Fashion and Apparel Designing", Book Enclave, Jaipur, P.69,70.
- Betzina, S.,(2003). " Fast fit: Easy pattern alteration for every figure", The tauton press Inc.,New town., Pp.6,7.
- Bhargav, P.and Chand,T.,(2005)."Textile and laundry",Common wealth publishers, New Delhi, 1st Edition,P.70.
- Bishop,E.B.,(1994). "The Bishop method of clothing construction",J.B. Lippincott publishing Company, Chicago, P. 192.
- Blaxland,K.,(2001). "Easy dress making techniques", Sally milner publishing Pvt. Ltd., Pp.18, 19.
- Brannon,E.L.,(2007). "Fashion forecasting", Fairchild publications Inc.,Newyork,1st Edition, P.14.
- Brown, H.B.,(2002). "Cotton", Biotech books, Delhi, P.1.
- Clayton, M.,(2008). "Make your own clothes", Collens and Brown publishers, UK,P.14.
- Cooklin, G., (2004). " Pattern cutting for women's outer wear", Blackwell science ltd, London, P.4.
- Cooklin, J.,(2007). " Introduction to clothing manufacture",4th edition, Black well science, London, P.104.
- Cooklin,G.,(1995). "Pattern grading for children's clothes-the technique of sizing",1st edition, Blackwell science Ltd., P.7.
- Corbman,B.P.,(2009). "Textile fibre to fabric",McGraw-Hill book company Inc., Newyork,P.309.
- Cox, and Warren., (1996). "Creative hands", John wiley and sons Inc.,Newyork, P.3.

- Damhorst, M.L., Miller, K.A. and Michelman, S.O.,(2001). "The meaning of dress", Fairchild publications, Newyork, P.280.
- Davis,J., (2007). "A complete guide to Fashion Designing", Abhishek Publications, Chandigarh,1st Edition,P. 30.
- Davis,J., (2009). "Fashion introduction-Life cycle and Communication", Abhishek publications, Chandigarh,1st Edition, P.9.
- Detrixhe,S.,(2004), "The everything sewing book", Adams media, USA,1st Edition, Pp.33,37,40.
- Doongji,S. and Deshpande,R.,(1988). "Basic process and clothing construction, Raj prakashan publishers, New Delhi,1st Edition, P.119.
- Frings, G.S.,(2001). "Fashion from concept to consumer", Prentice Hall, US of America, P.33.
- Gatterson,B.K. and Stewart, B.L.,(2003). "Apparel concepts and practical applications", Fairchild book Inc., Newyork, P.86.
- Gohl,E.P.G. and Vilensky,L.D.,(1999). "Textile science an explanation of fibre properties", CBS publishers and distributors, New Delhi, P.41.
- Gokerneshan, N.,(2005). "Fabric structure and design", New age international (P) limited, New Delhi,1st Edition, P.128.
- Gordon,J.,(2001). "Hand book of textile fobres vol.I; Natural fibres", Woodhead publishers, Ltd., Newyork, P. 65.
- Gupta, S., Garg, N, and Saini, R.,(2005). "The text book of clothing textiles and laundry", Kalyani publishers, New Delhi,1st Edition, P.340.
- Gupta,P.,(2008). "Costume designing", MD publications Pvt. Ltd., New Delhi, 1st Edition,P.2.
- Gupta,S.P.,(2006). "Statistical methods", Sulthan Chand and Sons Publication, New Delhi, Pp.215,221.
- Hayavadana.,(2004). "Textile and clothing management", Allied publishers Pvt. Ltd., New Delhi, 1st Edition,P.156.
- Heron, N. and Reinford, S.,(1999). "Creative textile", Blakie publication, London, P. 36.
- Huxley,S.,(1996). "Sewing secrets from fashion industry", Rodale press Inc.,London, P.16.
- Jaffe and Relis., (1993). "Draping for fashion design", Prentice-Hall Inc.,USA, P.2.
- Jefferson,S.,(2005)."Know all about clothing technology", Abhishek publications, New Delhi, 1st Edition,P.1.
- Kapildev,V.,(1999). "Cutting and tailoring theory", Asian publishers, Delhi, P.83.
- Kelvy, K.M.C. and Munslow,J.,(2005). "Fashion design process innovation and practice", Blackwell publishing, Oxford, P.17.

- Krishna,V.V., Dutt, B.S.and Rao,K.H.,(2001). "Disabled person",Discovery publishing house, New Delhi, P.3.
- Kulshrestha, U. and Kashyap, R., (2007). "Clothing behavior-psychological analysis", Pointer publishers, Jaipur,1st Edition, P.1.
- Mandoli,K.C., Khadi, B.M., Shirsat, S. and Kulkarni,V.N.,(1999). "Hand book of cotton in India- natural coloured cotton", Indian society for cotton improvement, Mumbai,3rd Edition, P.23.
- Mathews,M.,(1985). "Designing, drafting and tailoring-practical clothing construction : Part II, Cosmic press, Pp.1,16.
- Mee, J. and Purdy, M.,(1987). "Modelling on dress stand, BSP professional books, London, P.5.
- Mishra,S.P.,(2000). " Textile book of fibre science and technology", New age international pvt. Ltd. P.70.
- Mullick, P.,(2007). "Text book of textile designing", Kalyani publishers, Ludhiana,1st Edition, Pp.163,171.
- Mullick,P.,(2002). "Text book of home science", Kalyani publishers, New Delhi, Pp.316,321,322.
- Naik,S.P. and Wilson, J.A.,(2006). " Surface designing of textile fabrics", New age international publishers, New Delhi, 1st Edition,P.44.
- Narang,M. "Fashion technology hand book",Sonali publications,New Delhi, P.54.
- Neelima.,(2009). "Fashion and textile design", Sonali publications, New Delhi,1st Edition,Pp.291,292,295.
- Paine, M.,(1987). "Fabric magic", Winward Frances Lincoln Ltd., London, P.12.
- Parvathi,K.,(2007). "Textile and Laundry management", Pointer publishers, Jaipur,1st Edition,P.221.
- Pundir, N.,(2007). "Fashion technology-Today and tomorrow", Mittal publications, New Delhi,1st Edition, P.84.
- Purani, ,B. and Rawal, N.,(2000). "Visual impairment hand book",Blind people association (India), Ahammadabad, P.78.
- Rani, S.,(2007). "Textile and laundry", Arise publishers and distributors,New Delhi, 1st Edition,P.45.
- Rastogi, M.,(2009). "Cloth washing and ironing", Sonali publications, New Delhi, 1st Edition,P.1.
- Rastogi, M.,(2009). "Synthetic textile", Sonali publications, New Delhi, 1st Edition,P.55.
- Saluja, N.,(2006). "Recent developments in clothing construction", University book house, Jaipur, P.53.
- Sarkar, S., (2010). "Fashion pattern and dress design", Arise publishers and distributors, New Delhi,1st Edition, Pp. 219,221.

- Sharma and Khan.,(2009). “Research methodology”, Shree publishers, New Delhi,P.73.
- Singh ,K.V.P.,(2004). “Introduction to textile”, Kalyani publishers, Ludhiana,1st Edition, Pp.158,159.
- Sodhia,M.,(2000). “History of fashion”,Kalyani publishers, Ludhiana, P.147.
- Sodhia,M.,(2007). “Advanced drafting and draping”, Kalyani publishers, Ludhiana, P.7.
- Sumati, G,J.,(2005). “Elements of fashion and apparel designing”, New age international publishers, New Delhi, P.46.
- Tata, S.L., (2004). “Inside fashion design”, pearson education Pte.Ltd.New Delhi, P.117.
- Taylor,B., Sinha,G. and Ghoshal,T.,(2008). “Research methodology-a guide for researchers in management and social science”, Prentice-Hall of India Pvt.Ltd, P.37.
- Thomas, A.J.,(1999). “The art of sewing”, UBS publishers and distributors Ltd., London,Pp.70,71.
- Thompson, H.M.,Rea, E.L.,(1990). “Clothing for children”, Chapman and Hall Ltd., London, P.258.
- Udale,J.,(2008). “Textiles and Fashion”, AVA publishing SA, Switzerland, 1st Edition, P.89.
- Verma,G.,(2006). “Cutting and tailoring course illustrated”, Asian publishers, Delhi, 1st Edition, Pp.58,61,62.
- Wilson, J., (2005). “Hand book of textile design principle processes and practice”, Wood head publishing Ltd, England,Pp.19,20.
- Zarapkar,K.R.,(2008). “Zarapkar system of cutting”, Navneet publications(India) Ltd, Gujarat, Pp.13,78.

Journals:

- Anshu,Tuteja,S. and Singh., (2010). "Utility garments for spastic person as per their disability", Journal of textile association, Vol.70, No.6., P.295.
- Bala,S., Khambra,K.and Yadav, N.,(2008). "Options of traineesabout draft and paper patterns of kurta- pyjama for pre adolescent boys",Textile trends, Vol.XLV,No.3,P.33.
- Barik,A.,(2008). "World conference-4:The skilled session", Modern textile, Vol.3, Issue.5, P.46.
- Brahma, P,D.,(2007). "Cotton organic orientation", modern textiles, Vol.2, Issue.5, P.18.
- Chaudhari,S.,Singh,A.,Kumari,A. and Grover,E.,(2009). "Enrichment of cotton fabric with dye extracted from fruits of fistula", The textile and trade journal, Vol.47, No.3-4, P.13.
- Das,S.,(2009). "Safty aspects in children's garments",Asian textile journal, Vol.21, No.5, Pp.31, 34.
- Deshwal, R. and Khambra,K.,(2006). "Effect of soap and detergents on blending length of cotton fabric", Colourage, Vol.LIII, No.10, P.55.
- Goel,H.,(2007). "Visually impaired individuals and garment industry", The stitch times, Vol.5, No.11, P.64.
- Kesarwani, P., Singh, A. and Gangwar, A.K.,(2010). "Enrichment of 'king of fabric' by sodium alginate and its blend with guagum, Journal of textile association, Vol.71, No.1, P.14.
- Mahasavekar,U.P.,(2009). "practices of cotton fibre selection and procurement for optimum mixing", The textile industry and trade journal,Vol.47,No.1-2, P.15.
- Mandal,S, and Abraham, N.,(2010), "Fabric sewing thread properties and sewing parameters influencing seam quality", Asian textile journal, Vol.19, No.9, P.70.
- Naik, SD, and Marathi, S., (2003). "Performance fabrics", Textile Trends,Vol. XLVI, No.7, P.37.
- Pal, S., (2010)."Indian home textiles-developments and market scenario",Asian textile journal, Vol.19, No.4, P.48.
- Pant,S and Jain, M., (2010). "Knowledge of consumer regarding textiles", Textile trends, Vol. LIII, No.5, P.29.
- Patel, B. and Chaulkar, B.N.,(2007). "Comfort giving textiles and functional garments for upper limbs disabled by using stimulated model", New cloth market,Vol.21, No.12, P.30.
- Patil and Bindigeri,V,B.,(2001). "Selection of clothes", Textile industry and trade Journal, Vol. 35, No. 3-4, P.45.
- Ravindranath,K, and Reddy, P,B.,(2010). "A high yielding cotton hybrid with special features", Asian textile journal, Vol. 19, No.5, P.42.

- Sangwan,N.,Khambra,K. and Hooda, B.K.,(2006). "Analysis of blend influence on parameters of weft knitted fabrics, Manmade textiles in India, Vol.XLIX, No.7, P.264.
- Saraf,N.M. and Alat,D.V.,(2006). "Processing of cotton solution providers SAREX", New cloth market, Vol. 20, No.7, P.33.
- Seema,R and Meenu, S.,(2010). "Preference for developing guide lines for suitable clothing selection for aged people", Textile trends, Vol. LIII, No.3, P.23.
- Shah,D.,(2006). "Women's wear fabrics", Textile view magazine", Issue.75, P.135.
- Sharma,A. and Kaur,R.,(2003). "Paper patterns-an aid in popularizing art of sewing", Textile trend,Vol.XLVI, No.8, P.35.
- Shetty,V.,Hedge,A.M.,Bindigari,S. and Rai.K(2010). "Oral health status of visually challenged children- A south Indian study",Journal of clinical pediatric dentistry, Vol.34, No.3, P.15.
- Shrigavi,V.K. and Naik,S.,(2010)." A study of clothing preference of cerebral palsy children according to their physical limitation", Karnataka journal of agricultural sciences, Vol. 22, No.2, P.17.
- Singh, K.V.P. and Chattergee, A.,(2010). " Study on psychological comfort of fabrics made up of structurally modified friction spun yarn: part I vapour trnsmission", Indian journal of fibre and textile research, Vol.35, No.1, P.31.
- Singh,Y. and Goel,A.,(2001). "Evaluation of physical properties of cotton and bhang(cannabis sativa) blended yarn, textile trend, Vol.XLIV, No.1, P.29.
- Vimala,M. and Ramalakshmi, P.,(2010). " Designing comfort garments for children", The Indian Textile journal, Vol. LI, No.5, P.31.
- Yadav,N., Jeetsingh,S.S. and Sangwan, N.,(2007). "Value addition intop troser styles",Textile trends, Vol.XLIX, No.12, Pp.37.
- Zimniewska,M , Krunska I.,(2010). "The effect of raw material composition of clothes on selected psychological parameters of human organism", Journal of textile institute, Vol. 101, No.2, P.154.

Websites:

- www.tauton.com/pdf/fitting
- www.ditzyprints.com/fitting.htm
- www.joyshoppe.com/how to measure/ htm
- www.curvycounselor.com/ how-to-take-body measurements
- www.googlescholar.com
- www.freepatentsonline.com/42010/0306901.html
- http//:en.wikipedia.org/ wiki/reversible-garment
- www.accessmylibrary.com/article-1g1-118450939/reversibleclothing-model-versatality.html

APPENDICES

APPENDIX-I

INTERVIEW SCHEDULE TO ELICIT INFORMATION REGARDING MOTHERS PREFERENCES TOWARDS THEIR VISUALLY CHALLENGED GRADE SCHOOL GIRLS

A.General information:

1. Name of the interviewer :
2. Name of thee interviewee :
3. Address :
4. Educational qualification of women :
5. Occupation :
6. Monthly income of the family(in rupees) :
7. Type of family :
8. Age of children :
9. State of blindness :
10. Do you buy clothes for your daughter?
    Yes ☐ No ☐

11. Who purchases clothes for your child?
    Father ☐ Mother ☐ Self ☐ Sibling ☐ Grand parents ☐

12. How do you by clothes for your daughter?
    Ready made ☐ Home made ☐ Tailor made ☐

13. How frequently do you buy clothes for her?
    During festivals and celebrations ☐ As and when required ☐
    Once in a year ☐ During discount sales ☐

14. Where do you buy clothing items?
    Particular shop ☐ Retail shop ☐ Whole sale shop ☐
    Any shop ☐

15. Do you select garment suitable to different climatic conditions?
    Yes ☐ No ☐
    Detailed information regarding garments

16. Which type of style do you prefer more for your daughter? State the order of priority?
    Frock ☐ Middy and middy top ☐ Salwar- kameez ☐
    Pant and shirt ☐

17. What type of material do you prefer more for your daughter?
Cotton ☐ Synthetic ☐ Wool ☐ Blended ☐

18. What type of texture do you buy for your daughter?
Soft ☐ Rough and coarse ☐ Medium ☐ Slippery ☐

19. Which criteria do you consider while purchasing clothing items?
Suitability ☐ Comfortable ☐ Easy to wear ☐ Durability ☐

20. What type of fabric design do you prefer for your children?
Prints ☐ Plaids ☐ Stripes ☐ Dots ☐ Plain ☐

21. Did your daughter wear her garments by herself?
Yes ☐ No ☐

22. If no, how will you help her to dress up?

23. What kind of placket opening she prefers?
Front opening ☐ Back opening ☐ Side opening ☐
Without opening ☐

24. Which type of fastners she prefers the best, mark the order of priority?

Elastic ☐ Press buttons ☐ Hook &eye ☐ Zipper ☐ Shirtbuttons ☐
Shank buttons ☐ Eyelets and cord ☐ Loops ☐ Velcro ☐
Loopwith cloth buttons ☐

25. Did she like to wear fashionable garments?
Yes ☐ No ☐

26. Do you prefer reversible garments for them?
Yes ☐ No ☐

27. Do you think reversible garment is more comfortable than normal garment?
Yes ☐ No ☐

28. How longer your child can use one garment?
One year ☐ Two year ☐ Three year ☐ More than three years ☐

29. If one year, state reason?

30. Do you prefer adjustable garments for them?
Yes ☐ No ☐

31. Do you think adjustable garments have more life time than normal garment?
Yes ☐ No ☐

32. Which type of fitting do you prefer the best?
    Loose fitting ☐ Tight fitting ☐ Snug fitting ☐
33. Which type of shades do you prefer for your daughter?
    Light shades ☐ Dark shades ☐ Deep shades ☐
    Medium shades ☐
34. What type of fabric ornamentation do you prefer for your daughter, mark the order of priority?
    Embroidery ☐ Fabric paint ☐ Appliqué work ☐ Sequins work ☐
    Zardosi ☐ None of these ☐

35. Which price range (in Rupees) do you prefer to buy casual wears for them?
    200-300 ☐ 300-400 ☐ 400-500 ☐ Above 500 ☐

APPENDIX-II

VARIOUS DESIGNS OF GARMENTS OF VISUALLY CHALLENGED GRADE SCHOOL GIRLS

APPENDIX-III

THE VARIOUS BODY MEASUREMENTS TAKEN FOR VISUALLY CHALLENGED GRADE SCHOOL GIRLS

S.NO.	CG	WG	HG	S to S	WL	FND	BND	KL	ASR	LAC	HSL
1	51	49	49	21	22	8.5	6.5	56	21	15.5	6.5
2	51	46	46	21.5	23	8.5	6	57	22	16	6.5
3	52	46.5	46.5	21.5	21	9	6	57.5	22	16	6.5
4	54	50	50	22	22	9	7	57.5	22.5	17	7
5	55	53.5	53.5	22	23.5	8.5	7.5	56	24	17	6.5
6	52	47	47	23	24	8.5	7	56	24	15.5	8
7	53.5	51	51	22	25	8.5	7	57	23	15.5	7
8	55	48.5	48.5	24	23.5	10	8	58	22	16	7
9	52.5	51	51	23	22	9	8	58	24.5	17	6.5
10	52.5	47	47	21	21.5	9	7.5	56	23	17	6.5
11	51	49	49	22.5	22	9	8	58.5	25	18	8
12	51.5	51	51	21.5	24	10	8	58	21	19	8
13	54	52	52	22	23.5	9.5	8	60.5	22.5	19	7
14	54.5	52.5	52.5	23	24	9	6.5	61	22	18	7
15	52	51	51	23.5	25	9.5	7.5	61	23	17	7
16	55	54	56.5	23	24	10	6.5	62	25.5	19	7.5
17	53.5	52	56	22	23	10	7	62	26	20	7.5
18	52.5	51	57	21	22	10.5	7	62.5	26	20	8
19	54	53.5	57.5	21.5	21.5	9.5	7.5	64	27.5	19.5	8
20	54.5	52	57	21.5	22	9	7	63	26	16	6.5
21	59	54	60.5	23	23.5	9	8	63	27	17.5	7.5
22	58	55	61	22	23	10.5	8	63.5	28	18	8
23	58.5	56	62	22	24	11	7.5	64	28	19.5	8
24	60	58	63	24	25	11	8	64.5	28.5	18	8.5
25	56	56	61.5	25	25.5	11.5	8.5	65	29	19	9
26	57	56	61	26	26	12	8.5	65	29	17.5	9
27	59	57.5	63.5	26.5	26	12	9	63	27	18.5	9
28	58.4	57	63	26.5	27	11	9	62	28.5	18	10
29	56.5	56	61	27	27.5	12	9	62.5	28	16	9.5
30	56.5	56	61.5	26	27.5	12	10	61.5	29	17	8.5
31	59	58	63	25.5	28.5	11.5	9.5	61	29.5	17.5	9
32	58.5	57	62.5	26	29	11.5	8.5	61.5	29	18.5	9.5
33	57	56	61	27	26.5	12	8.5	62	29	18	10
34	56	55	62	27.5	25.5	12	8.5	62	27	19	8.5
35	60.5	59	63	27.265	27	12	9	62.5	27.5	19	8.5
36	62.5	57	63.5	26.5	27	11	9	63	28	20	9
37	65	58	64	27.5	28	10.5	8.5	65	28.5	20	9.5
38	65	58.5	64	28	28.5	10.5	8.5	65	27	19	10
39	64.5	57.5	63	28	29	11	9	64.5	29	18	10
40	64	58	62	29	28.5	11	9	64	28.5	18.5	9

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
41	65	59.5	61.5	29	29	12	9	62	27.5	19	9
42	62	60	65.5	28.5	27	12	10	63	28	19	9
43	61.5	59	65	29.5	26	12.5	10	63.5	29	19	10
44	65	59.5	66	26	25.5	12.5	9.5	64	30.5	18.5	10
45	64.5	58	65	27	26	11.5	9	65	31	18.5	9
46	64	58	67	27	28	11	9	61	31	19	8.5
47	63.5	57.5	66.5	27	29	11	9	61	31.5	19	9.5
48	63	57	66	28	28.5	10.5	8.5	62	32	21.5	9
49	63	58	65	26	29.5	11.5	9	62	32	22	9
50	65	59	65	26.5	28	11.5	9	62	32	23	9
51	63	59	67	26	28	10.5	9	65	31	24	8.5
52	62	58	67.5	26.5	28.5	10	9	65.5	32.5	24.5	9.5
53	62.5	58.5	68	26	27.5	11	10	67	32	25	9
54	61.5	56	68	27.5	29	11	10	67	32	23	9.5
55	63	57	68.25	28	29	12	10	67.5	33	23	9.5
56	63	57	69	28	30	12	10	67	31	24	8.5
57	64	58.5	70.5	27	30	12	9.5	66	32	24	8.5
58	64	57.5	70.5	27	31	10	9	65.5	32.5	25	9
59	64.5	57	71	27	32	10	9	66	32.5	22	9
60	65	58.5	74	26	29	10	9	67	31	23	9
61	65	58	73	26.5	28	11.5	9	67.5	33	23	9
62	63.5	58	73	27	28.5	11.5	8.5	68	33	22	8.5
63	63	59	72	26	27	11	8.5	69	34	22.5	9.5
64	63	60	72	27.5	26	10	9	70.5	34.5	24	10
65	64.5	60.5	72	28	26	10	10	71	33	24	10
66	64	62	73	27.5	28	11	8.5	71	33	23	8.5
67	65	63	73.5	28	29	11	10.5	72	34	23.5	9
68	64.5	64	74	28	29.5	12	10.5	72.5	31	23	9
69	63	64.5	74.5	29	30	12	11	72	32	22	9
70	65	61	73	29.5	30.5	12.5	11	73	32.5	22.5	10
71	65.5	62	72	28.5	31	13	11.5	73.5	33	21	120
72	65.5	62.5	73	30.5	31	13	11.5	74	34	21	10
73	66	63	74.5	31	32	14	12	75	35	21.5	10
74	67	63	75	31	32	13	12	74	33	22	11
75	67	63.5	71	32	33	13.5	11.5	73	31	22	11.5
76	66	64	72	31	34	12	10.5	74	31	23	12
77	65.5	64.5	72.5	32	34	12.5	11.5	75	32.5	23.5	12
78	68	63	73	32.5	34.5	12	10	75.5	32	24	11.5
79	69	63	73	32.5	31	12	11	76	34	24.5	12
80	69.5	62.5	73.5	33	34.5	13	11	76	35.5	22	11
81	70	62	75.5	33	35	13	11.5	77.5	36	23	11
82	70	62	75.5	32.5	35	14	12	78.5	36	23.5	10.5
83	69	61.5	76	31	33.5	14	11.5	78	37	24.5	11.5
84	69.5	61	76	34	33	13	12	79	37	24	11
85	68	64.5	77.5	33.5	32	13.5	11.5	78	38	24.5	11
86	69	61	76	34	31	13	10.5	78	35.5	25	11.5

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
87	67	61	78	35	32	13	10.5	79	36	25.5	11
88	68	62.5	78.5	33.5	33	12.5	11.5	78.5	37	26	12
89	70.5	62	79	32	31	12.5	11.5	79	37	26	12
90	71.5	62	79.5	34.5	30.5	13	10.5	80	38	27	12
91	72	65.5	77	32	30.5	13	10.5	80.5	39	27.5	11.5
92	72	66	77.5	33	31.5	13.5	11	81	39	28	11.5
93	72	67	80.5	31	32	13.5	11	82	38	28	12
94	73	67.5	81	34.5	32	14	11.5	82	37	28.5	12
95	74	66	81	35	30.5	14	12.5	83	38	27	11
96	73	65.5	82	31	31	14	13	82	38	26	11
97	73.5	65.5	83	32	32.5	13.5	12.5	81	39	26	11
98	74	66.5	82.5	32.5	33	13	12	84	35.5	26.5	10
99	75	66	81	33	32	12.5	12.5	81	36	25.5	11
100	75.5	67	80.5	33	34.5	13	12	81.5	37	28	12

Body measurements:

1. CG - Chest Girth
2. WG - Waist Girth
3. HG - Hip Girth
4. S to S - Shoulder to Shoulder
5. WL - Waist Length
6. FND - Front Neck Depth
7. BND - Back Neck Depth
8. KL - Knee Length
9. ASR - ArmScye Round
10. LAC - Lower Arm Circumference
11. HSL - half sleeve length

APPENDIX-IV

SAMPLE CALCULATION OF MODAL VALUE

Chest girth		
	50-55	20
	55-60	14
	60-65	36
	65-70	18
	70-75	11
	75-80	1

$M_O = L + \frac{\Delta 1}{(\Delta 1 + \Delta 2)} \times i$

Where,

L = Lower limit of the modal class

Δ_1 = Difference between the frequency of the modal class and pre-modal class

Δ_2 = Difference between the frequency of the modal class and post-modal class

i = Class interval of the modal class.

$M_0 = 60 + \frac{36-14}{(36-14)+(36-18)} \times 5$

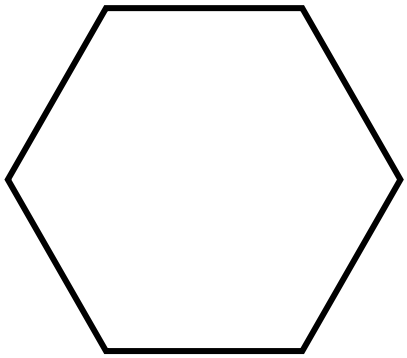
$M_0 = 60 + \frac{22}{(36-14)+(36-18)} \times 5$

$M_0 = 62.75$

The modal value = 62.75

APPENDIX-V

MATERIAL USED FOR MUSLIN PATTERN

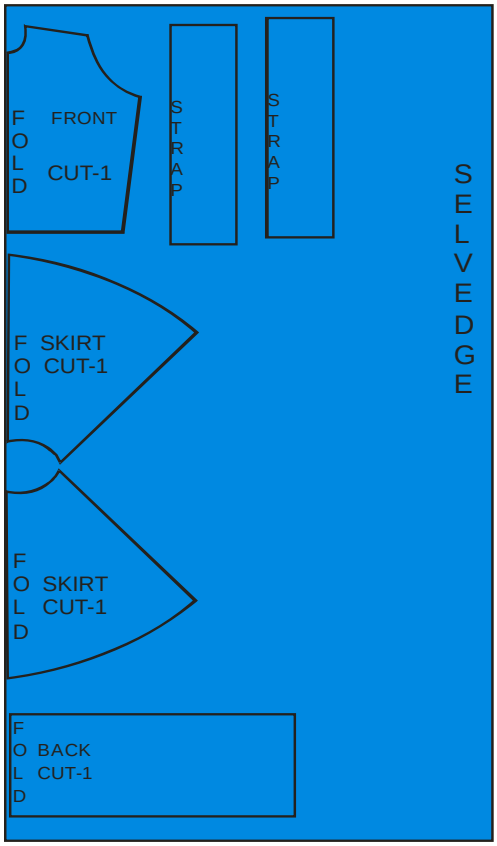


Type: 100 percent Preshrunk cotton

Cost : Rs.35per meter

APPENDIX-VI

SAMPLE LAYOUT OF BF_2



APPENDIX-VII

EVALUATION OF THE MUSLIN FROCK BY VISUALLY CHALLENGED GRADE SCHOOL GIRLS

S No	Aspects	Satisfactory(in percentage)	Not satisfactory(in percentage)
A	**Frock**		
1	Chest girth		
2	Waist girth		
3	Hip girth		
4	Shoulder to shoulder		
5	Front neck girth		
6	Back neck girth length		
7	Frock length		
B	**Sleeve**		
1	Armscye round		
2	Lower arm circumference		
3	Half sleeve length		
C	**Additional features**		
1	Length adjustable features		
2	Girth adjustable features		

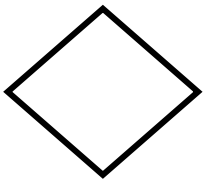
APPENDIX-VIII

EVALUATION OF THE MUSLIN FROCK BY STUDENTS

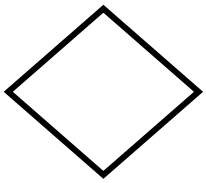
S.No	Aspects	Satisfactory(in percentage)	Not satisfactory(in percentage)
A	**Frock**		
1	Chest girth		
2	Waist girth		
3	Hip girth		
4	Shoulder to shoulder		
5	Front neck girth		
6	Back neck girth length		
7	Frock length		
B	**Sleeve**		
1	Armscye round		
2	Lower arm circumference		
3	Half sleeve length		
C	**Additional Features**		
1	Length adjustable features		
2	Girth adjustable features		

APPENDIX-IX

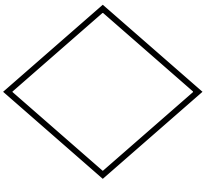
FABRICS USED FOR SELECTED FROCK STYLES



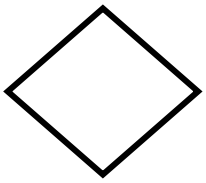
CF_1



CF_2



CF_3



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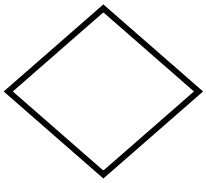

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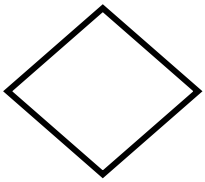

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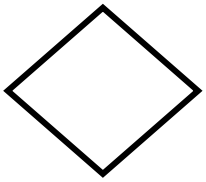

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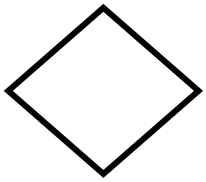

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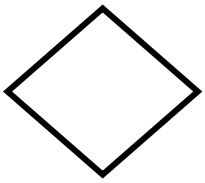

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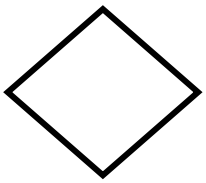

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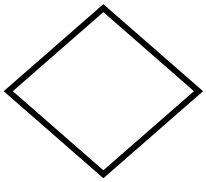

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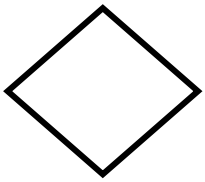

BF_2

APPENDIX-X
EVALUATION BY THE VISUALLY CHALLENGED GRADE SCHOOL GIRLS

S.No	Outfit	Comfort			Easy to wear			Fitness			Able to identify the work			Texture		
		Good	Fair	Poor	Good	Fair	poor	good	fair	poor	easy	difficult	Not able to find	good	fair	poor
1	CF_1															
2	CF_2															
3	CF_3															
4	CF_4															
5	CF_5															
6	CF_6															
7	CF_7															
8	CF_8															
9	SF_1															
10	SF_2															
11	BF_1															
12	BF_2															

APPENDIX-XI
EVALUATION BY HOMEMAKERS

S.No	Outfit	General appearance			Texture			Colour combination			Reversible and adjustable features			Style		
		Good	Fair	Poor	Good	Fair	poor	good	fair	poor	easy	difficult	Not able to find	good	fair	poor
1	CF_1															
2	CF_2															
3	CF_3															
4	CF_4															
5	CF_5															
6	CF_6															
7	CF_7															
8	CF_8															
9	SF_1															
10	SF_2															
11	BF_1															
12	BF_2															

APPENDIX-XII

EVALUATION OF FROCKS BY PG STUDENTS

S no	Outfit	Ease			Grain			Line			Balance			Set			General appearance			Style			Colour combination		
		Correct	Loose	Tight	Good	Fair	poor	Smooth	Fairly smooth	Not smooth	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
1	CF_1																								
2	CF_2																								
3	CF_3																								
4	CF_4																								
5	CF_5																								
6	CF_6																								
7	CF_7																								
8	CF_8																								
9	SF_1																								
10	SF_2																								
11	BF_1																								
12	BF_2																								

APPENDIX XIII

COST SHEET OF CONSTRUCTED GARMENTS

S.No.	Particulars	Quantity (Meters)	Price/meter(Rs.)	Amount(Rs.)
1	**CF_1 and CF_2** Fabric Stitching charge* Paint *	4	40	160.00 150.00 50.00
	Total			360.00
2	**CF_3 and CF_4** Fabric Stiching charge*	4	50	200.00 200.00
	Total			400.00
3	**CF_5 and CF_6** Fabric Stitching charge* Embroidery*	4	40	160.00 170.00 50.00
	Total			380.00
4	**CF_7 and CF_8** Fabric a.Red and Black Checks b.black Stitching charge*	2	65	130.00 20.00 160.00
	Total			310.00
5	**$SF_1$and SF_2** Fabric Stiching charge*	4	60	240.00 160.00
	Total			400.00
6	**BF_1 and BF_2** Fabric Stitching charge* Appliqué work	4	35	140.00 200.00 20.00
	Total			360.00