



PAT December, 2012; 8 (2): 11-24 ISSN: 0794-5213

Online copy available at

www.patnsukjournal.net/currentissue

Publication of Nasarawa State University, Keffi



The Challenges of Pattern Drafting and Large Scale Garment Production In Nigeria

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Abstract

The paper discusses three methods of pattern drafting, Flat-Pattern, Draping and Drafting each of which could be employed in large scale garment production. The relevance of accurate measurements as key to pattern size that ensures fitting clothing designs is emphasized. The challenges of pattern making and large scale garment production in Nigeria are highlighted particularly figure types, shape and proportions of targeted wearers, colour separation in designs, texture of fabrics, figure and styles with regard to appearance and wearing comfort, availability and affordability of commercial patterns and issues of advertisement and control of market. The paper concludes that the challenges of pattern making for large scale garment production in Nigeria are enormous but could be surmounted with strong will and determination.

Introduction

Pattern making is the art of designing the outline of the plan or arrangement for sewing a cloth. Thomas (2009) posits that the first step in pattern making is taking of body measurements. She recommends that when taking measurements for pattern making, the person should just wear normal underclothes, and if a lady, normal pantyhose and normal bra. Steele (2008) noted that a system of sizes and patterns made it possible to fit the body, especially the male body, without resorting to custom-made clothing. Varney (1980) also indicated that patterns are needed in dress-making in order to obtain a better fit and to save material. Aldrich (2006) justifies the use of block patterns in the clothing industry because the blocks are constructed to standard (average) measurements for specific groups of people but could also be drafted to fit an individual figure using personal measurements.

Garment production involves an interest in manufacturing clothing, or establishing a clothing factory which certainly involves skilled personnel in areas of pattern drafting, designing, sewing, trimming, embroidery, and textile print. To assemble and coordinate the activities and creative imaginations of these categories of craftsmen in a factory situation could be quite challenging for entrepreneurs in Nigeria as we shall see in this paper.

Methods of Pattern Drafting

Hollen (1972) advocated three methods of pattern making, namely: Flat-Pattern, Draping and Drafting.

Flat-Pattern drafting, according to Sempstress (2010) is the art of taking a set of measurements, a sheet of paper, and a pen, and coming away with a pattern. Flat pattern is based on commercialized basic patterns with standard measurements but when employed in designing, one makes use of fitting darts to increase garment fitting. Hollen (1972) posited that Flat - Pattern has several advantages which include the ability to design patterns to fit into economical fabric layouts, the possibility of restyling old patterns and out-of-date clothing into new ones, the ease for determining causes of mistakes and how to correct them, and flexible planning for new procedures and efficient organization of work.

Commercial Patterns are drafted patterns made by professional pattern companies or industries. They are sold in different sizes; hence Fayemi; George; Akingbemi; Abraham; Akinsete and Douglas (1989) advise that individuals should know their body measurements in order to select the correct size. To ensure accurate measurements for men's patterns, Musheno (1980) advised that the stance of the man being measured should be natural and kept away from mirrors which despite the assumption of an ideal figure (one that is too erect, and with taut rather than relaxed muscles) will cause the garment to fit improperly with normal stance. For a female, Thomas (2009) prescribes that the lady should stand straight and be relaxed in an upright posture with feet together.

Taking accurate measurement is regarded as the foundation on which drafting as a method of pattern designing is built (Weber, 1990; Clayton, 1997; Aldrich, 2006; Horton, 2008). As if to justify this point, Ezema (1996) noted that such principles of design as proportion, balance, rhythm, emphasis and harmony, all depend on accurate measurements. Kindersley (1996) also posited that accurate measurements are needed for choosing a pattern size. A perfect fit, she argued, is ensured by comparing your own measurements with those of the pattern, taking tolerance into account and thereafter making any adjustments. Pattern pieces are measured between the seam lines, not from edge to edge. Similarly, the art elements of design such as vertical lines, horizontal lines, diagonal lines, curved lines, and shape rely on accurate measurements if they will have the desired effects in communicating emotions, ideas, feelings and mood (Ezema, 1996).

Both Weber (1990) and Clayton (1997) believed that custom fit of garments begins with accurate measurements. This implies that the success of any system of flat pattern drafting will depend upon the accuracy with which the measurements have been taken and the accuracy with which they are translated to the pattern. It is difficult to replicate body measurements because each person has a different hand with the tape

measure (Minott, 1978). Consequently, the most common error in measuring is measuring too tightly. Saladino (1970) had suggested measuring with one or two fingers under the tape measure to allow ease while Weber (1990) suggested the assistance of somebody to ensure accuracy. The stance of the person being measured may vary during the measurement session or in the time from measurement to fitting.

Draping is an artistic approach in which the person makes a pattern by fitting a large rectangle of woven cloth around the body so that the folds in the fabric produce the dress pattern according to the curves of the body. Vulker and Cooper (1987) suggested that draping originated from the Greeks and the Romans. The Greeks called their draped garment a *chiton* whose shape was achieved by draping, girdles and pinning after which embroidery was applied. The Romans had different names for draped garments for males and females. The male garment was called *Tunica* while the female draped dress was called *Stola*. Vulker and Cooper (1987) noted that draping required little technical skill, as no patterns or sewing were required, hence draped garments began to be replaced by clothing cut to a pattern. However, anybody who wishes to embark on large scale garment production by draping approach to pattern making could do so through line-for-line copy of already sewn garment.

Drafting is a scientific process of pattern designing that is based on a set of body measurements. Therefore, taking accurate measurements is the foundation of creativity in pattern making. Okorie (2000) regards creativity and knowledge of measurements as imperative characteristics of garment designers. Draft patterns usually rely on basic pattern as foundation or master pattern. The basic pattern for men's wear (shirt and trouser) consists of several measurements to achieve custom fit (Musheno, 1980). For shirt patterns, the needed measurements consist of neck, neckband, shoulder, chest, centre front length, centre back, back width, waist, arm length, arm circumference, and sleeve length. For trousers, the required measurements are the waist, seat (hip), high hip, thigh, knee, out-seam (side lengths), Inseam, and hemline. Aldrich (2006) recommends standard body measurements for the dresses of men of average built (about 5ft 10ins or 178cm). This is shown in table 1 below. Musheno (1980) suggested that the actual measurement of the pattern piece for men will be larger than the body measurement for which it is designed in order to allow wearing ease. Musheno (1980) has provided Vogue's average body measurements for women with fully developed figure and height of about 5'6" (1.60M). This is shown in Table 2 while Table 3 shows the women's pattern sizes.

Table 1: Men’s Standard Body Measurements (Height 170cm – 178cm (5ft 7in – 5ft 10in))

AVERAGE SIZES	SMALL		MEDIUM		LARGE		EXTRA LARGE	
A: CHEST	88	92	96	100	104	108	112	116
B: SEAT	90	94	98	102	106	110	114	
C: NATURAL WAIST	71	75	79	83	87	91	95	
D:TROUSER WAIST (14cm below natural waist)	74	78	82	86	90	94	98	
E - F: HALF BACK	18.5	19	19.5	20	20.5	21	21.5	
G óH: NATURAL WAIST LENGTH	43.4	43.8	44.2	44.6	45	45.4	45.8	
G-I: SCYE DEPTH	22	22.8	23.6	24.4	25.2	25.6	26	
J: NECK SIZE	37	38	39	40	41	42	43	
K-L: SLEEVE LENGTH, ONE PIECE SLEEVE	63.7	64.2	64.8	65.4	66	66	66	
E-M: SLEEVE LENGTH, TWO PIECE SLEEVE	79	80	81	82	83	83.5	84	
N-O: INSIDE LEG	78	79	80	81	82	82.5	83	
P-Q: BODY RISE	26.8	27.2	27.6	28	28.4	28.8	29.2	
R: CLOSE WRIST MEASUREMENT	16.4	16.8	17.2	17.6	18	18.4	18.8	
EXTRA MEASUREMENTS								
GARMENT LENGTH	<i>varies with type of garment and with fashion</i>							
CUFF SIZE, TWO-PIECE SLEEVE	26	27	28	29	30	31	32	
TROUSER BOTTOM MEASUREMENT	23.5	24	24.5	25	25.5	26	26	
JEANS BOTTOM MEASUREMENT	20.5	21	21.5	22	22.5	23	23	

Table 2: Women’s Body Measurements for fully developed figure and about 5’ 6” (1.60m)

Sizes	30		32		34		36		38		40		42		44	
	in	Cm	in	cm	in	cm	in	cm	in	cm	in	cm	in	cm	in	cm
Bust	34	87	36	92	38	97	40	102	42	107	44	112	46	117	48	122
Waist	26.5	67	28	71	30	76	32	81	34	87	35	89	37	94	39	99
Hip	36	92	38	97	40	102	42	107	44	112	46	117	48	122	50	127
Back waist length	16 ^{1/2} ₈	41.5	16 ^{1/2} ₈	42	16 ^{3/8} ₈	42.5	17	43	17 ^{1/8} ₈	44	17 ^{1/8} ₈	44	17 ^{3/8} ₈	44.5	17 ^{3/8} ₈	45

Table 3: Women’s Pattern Sizes for fully developed figure and about 5’ 6” (1.60m)

Sizes	30		32		34		36		38		40		42		44	
	in	cm	in	cm	in	cm	in	cm	in	cm	in	cm	in	cm	in	cm
Shoulder length	5	12.5	5 ^{1/8} ₈	13	5 ^{1/8} ₈	13.5	5 ^{1/8} ₈	13.5	5 ^{1/8} ₈	14	5 ^{1/8} ₈	14.5	5 ^{1/8} ₈	14.5	5 ^{1/8} ₈	14.5
Back width	14 ^{1/8} ₈	37	15	38	15 ^{1/8} ₈	39.5	16	40.5	16 ^{1/8} ₈	42	17 ^{1/8} ₈	43.5	17 ^{1/8} ₈	45	18 ^{1/8} ₈	46
Sleeve width	13	33	13 ^{1/8} ₈	34	13 ^{1/8} ₈	35	14 ^{1/8} ₈	36.5	15	38	15 ^{1/8} ₈	39.5	16	40.5	16 ^{1/8} ₈	42
Sleeve length	23 ^{1/8} ₈	59	23 ^{1/8} ₈	60	23 ^{1/8} ₈	60.5	24 ^{1/8} ₈	61.5	24 ^{1/8} ₈	62	24 ^{1/8} ₈	62	24 ^{1/8} ₈	62	24 ^{1/8} ₈	62.5
Shirt length (from back waistline)	23	58.5	23 ^{1/8} ₈	59	23 ^{1/8} ₈	59.5	23 ^{1/8} ₈	60.5	24 ^{1/8} ₈	62	24 ^{1/8} ₈	62	24 ^{1/8} ₈	62.5	24 ^{1/8} ₈	63

There are today commercialized basic patterns of standard sizes but Vulker and Cooper (1987:84) insisted that their use must follow certain principles of design, namely: "Line and Direction, Shape and Proportion, Colour, and Texture".

The line of a dress gives a direction to be followed by eyes. Lines may be vertical, horizontal, oblique or curved. The direction of a line can assist in creating an illusion that may camouflage a figure problem. For instance, horizontal lines could make a woman appear wider than she really is. This is because the eyes of beholders follow the lines across the person.

Shape remains significant in pattern designing because it gives the silhouette or outline of the clothing, although the shape of garment changes with fashion (Clayton, 1987; Rouse, 1989). The outline of the clothing affects its proportions which refer to the space relationships within the design, and involves relating such measurements as size and bulk (Musheno, 1980). Good proportion is achieved when the various sections of a garment relate well to the whole garment. Different proportions suit different figures; hence, Horton (2008) advises that the type of figure, "its proportions and characteristics" should be considered when selecting the style of a garment so as to disguise figure problems. Consideration of figure type and body measurements is also necessary in order to avoid too much of pattern alterations before achieving a perfect fit. She further argued that female body shapes vary greatly, and so patterns are sized not only for direct measurements but for figure types of varying proportions.

Colour is linked with aesthetics and can affect our emotions and moods. Webber (1990) stated that colours act symbols that convey several messages. She illustrated with the colours of traffic lights without which there would be traffic jam. She noted that while some colours suggest coolness, others appear hot. According to her, red, orange, and yellow colours express excitement and simulate action while blue, green and violet have a subduing effect and convey a sense of calm and relaxation. Even our experience shows that while bright colours such as red and yellow are happy and exciting, black and grey seem to be somber and depressing to some people. Vulker and Cooper (1987) posit that dark colours tend to make people look smaller, while brighter colours could make people appear bigger. They therefore advise that women with heavy hips should choose cool colours for their skirts.

Texture is an important design element. Ezema (1996) noted that texture is associated with the sense of touch. The texture of a fabric may be rough and bulky like wool, shiny like satin or dull and soft like velvet. Musheno (1980) stated that texture contributes to an impression of size. Hence, rough and thick textures seem more bulky than they really are. Similarly, shiny, lustrous fabrics reflect more light and thus make one to appear larger than the person really is.

Development of the Pattern Drafting System

Body shape will be analyzed to determine the measurements necessary to describe body length, width, curves, and angles. The essential measurements according to Varney (1980) are:

- Length: Hip depth, Shirt length, Back bodice length, Front bodice length, Apex level, Shoulder length, Arm length, and In-seam*
- Width: Hipline - front and back, Upper leg, Neck, Chest line - front and back, Arm, and Waistline*
- Curves & Angles: Waist to floor - side, center front, and center back, Contour waist to floor - front and back, and Shoulder slope*

Varney (1980) also observed that width measurements varied considerably when taken with a tape measure. She therefore devised a method of using strips of pattern tissue paper one cm wide and long enough to encircle the part of the body being measured. Because the paper was relatively fragile, it will not depress the flesh without breaking; and an accurate measurement could be obtained. Harold & John (1992) and Igbo & Iloeje (2003), have suggested different methods of making patterns to obtain well-fitted garments for women with different figure types. These include flat pattern, draping, knock - off methods, computer aided design (CAD) and drafting pattern.

Factors to consider in Clothing Construction

The critical issue in dress designing is to achieve clothing fit. Colton (1979) considered clothing fit as consisting of four main factors, namely: appearance, comfort, design, and fabric.

Appearance ó To achieve elegant appearance, Robertson (2008) recommends different clothing designs that complement different body shapes and figures. The following instances are noteworthy:

- *Hourglass shape* - Women with hourglass shape (shoulders and hips equally wide with a narrow waist) have coveted figures with nothing to hide or compensate for. They can wear style of prom dress that is long, short, and sleeveless, with or without a jacket.
- *Busty shape* - Women with busty shape (shoulders wider than hips) should wear dresses that de-emphasize the upper body, e.g. a gown that attracts the eye to the hemline or waistline. A scarf or a jacket can also assist to disguise the figure fault.
- *Triangle or Pear shape* ó Women in this category have hips wider than shoulders. Because of their bottom-heavy figure, they should wear prom dresses with an a-line or full skirt to de-emphasize the hips. They can also have a fitted top to draw

attention more to the upper portion of the body

- *Petite Figure* ó Women that are short and heavy should choose garments that give illusions of height and draw attention to the face and hair, e.g. short skirts rather than ankle-length skirts. For short and slim women, shirtwaist dresses and business suits are recommended. Earrings, necklaces, and hairpieces can also be used to highlight the face, neck and upper body.
- *Square shape or Thick middle* ó Women in this category have shoulders, waist and hips are equally wide; the waist is not clearly indented such that waist measurement is similar to that of chest and hips. To appear elegant, choose unfitted, but not full, garments such as over blouses, empire lines, and tunic and log sweaters.

Comfort - With regard to wearing comfort, the garment should have sufficient ease added to the body measurements to allow the person to sit, walk, reach, and bend without feeling restricted.

Design- In the case of design, the amount of ease added to a garment is based on the design which is either a loose fit (example: caftan), a close fit (example: sloper pattern), or a combination of the two (example: shirtwaist dress with a pair of trousers).

Fabric - Recommendations for fabric are usually enumerated on commercial pattern envelopes which are foreign in origin. Nevertheless, the pattern maker normally takes into account the structural characteristics of a fabric when drafting a pattern. For example, a pattern for a knit will have less wearing ease than a pattern intended to be made in a heavy fabric.

Challenges of pattern making and large scale garment production in Nigeria

Like every other thing, the use of patterns, be they commercial or drafted, has its advantages and disadvantages. While the advantages will favour large scale garment production in Nigeria, the disadvantages would constitute challenges to be overcome if any success will be achieved. On the vantage side, the use of patterns saves time, energy, anxiety and money. Patterns are accurate to a point; therefore good fitting is likely to be achieved. They are available in different sizes to suit different figures. If the accompanying instructions are carefully followed, the results are satisfactory (Christensen, 1977). Patterns are inexpensive in the long run in that several dresses could be made from one pattern. They give dresses a tinge of professional touch. Finally, printed pattern process can be easily used by inexperienced dressmakers.

However, there are challenges to be faced by anyone that wishes to embark on large scale garment production in Nigeria. Some of the challenges relate to the socio-economic and political environment of Nigeria while other challenges centre on the

clothing choices or fashion desires of the potential buyers of garments to be manufactured on a large scale. Below are some of the challenges.

The challenges of poor infrastructure and safe business environment - The poor state of infrastructure in Nigeria with particular reference to electricity supply and transport facilities does not encourage investments that will involve large scale production of goods. There is no regular supply of power; hence the entrepreneur must be prepared to spend more on the purchase and running of generators. The roads are bad, hence an investor in large scale production of garments must be prepared to confront incessant breakdown of vehicles used for distribution of goods. But perhaps the greatest scare to potential investors in Nigeria may be associated with insecurity of lives and property due the often reported cases of armed robbery, 419 and kidnapping. It means that the large scale producer of garments must spend more to provide and maintain private security outfits. Even the movements of bulk materials whether fabrics used as raw materials in the garment industry or the finished garments may require police escorts to arrive safely at destinations.

The challenge of availability and affordability - The commercial patterns to rely upon in large scale garment production are not available in most parts of the country. One has to wait for a considerable length of time for an order to be sent through to companies or their agents. Furthermore, some dressmakers may find the patterns expensive to buy. Again, the patterns may require adjustments or alterations if the figure is not proportionate; and this might be difficult for an inexperienced dressmaker (Rydell, 1972). As yet another challenge is the danger that use of commercial patterns may tend to make the dressmakers dependent on them. This implies that generating what could be called indigenous patterns may become a road that is never taken. In any case, there are very few professional pattern makers in Nigeria and their absence in most parts of the country constitutes a formidable challenge to large scale garment production in Nigeria.

The challenge of pattern measurements - Perhaps the most formidable challenge is connected with evolution of average body measurements for target consumers of the garments to be produced on a commercial scale. The importance of accurate measurements in commercial garment production was brought to the fore by the outcome of Iloeje's research in 1995. Iloeje (1995) experimented on the establishment of average body measurements of female adolescent students for use in drafting block patterns for them. She involved 600 female adolescents randomly drawn from 55 girls' junior secondary schools in Enugu State. She took measurements of 18 parts of the body using a fibre-steel tape. After statistical analysis of obtained data, she found no significant difference in the mean body measurements of adolescent females aged 12 to 14 years for bust, waist, and hip and back waist length. On the basis of the findings, the

researcher drafted one set of sloper comprising front bodice master pattern, back bodice master pattern, front shirt, back shirt and sleeve patterns for the target group. Iloeje concluded from the outcome of the study that 'patterns are basic essentials in the construction of perfectly fitted garments'. But the question remains: How many patterns have been developed by indigenous pattern makers for different categories of individuals in terms of age, sex and body size and/or shape)? Generally, patterns are made for three common groups of sizes (not ages) based on standard measurements. These three major groups based on body somatotype are the endomorph for the largest category; mesomorph for the middle category and ectomorph for slim lanky figures (Anikweze, 2003).

The challenge of colour separation in designs - Manipulation of colour through dyeing of fabrics may constitute another challenge for large scale garment production in Nigeria. Colour is linked with aesthetics and can affect our emotions and moods. Dyeing and applied design are progressively being perfected by textile industries in order to satisfy man's unquenchable decorative instinct (Musheno, 1980). Experience shows that blue and green colours are cool and serene, bright colours such as red and yellow are happy and exciting while black and grey are somber and depressing to some people. However, people's emotions and taste could change with time. There is therefore the challenge of embarking on continuous research to find out the changes in people's fashion desires. For instance, black colour used to be the colour for mourning dress but Christians nowadays prefer white. In spite of this emotional attachment to colour differences, Vulker and Cooper (1987) had posited that dark colours tend to make people look smaller, while brighter colours could make people appear bigger. They therefore advise that women with heavy hips should choose cool colours for their skirts.

The challenge of choice of texture of fabrics - It has been noted that texture contributes to an impression of size. Hence, there is the challenge of selecting fabrics with textures that would reflect the needs or fashion desires of potential buyers of garments produced on a large scale. Perhaps the climate or seasons of the year may assist in determining whether rough and thick textures or shiny and lustrous fabrics would be selected for garments. This is because rough and thick textures seem to give more bulky impression than they really are while shiny and lustrous fabrics reflect more light and thus make one to appear larger than the person really is. More importantly, the practice of not wearing the right texture of material in line with the weather condition could predispose the individual to the attack of pneumonia or heat rashes (Ezema, 2001). Garment makers on a large scale must give consideration to these factors.

The challenge of figure and styles - Figure type is the different shapes seen on human beings or a representation of a person (Spenser, 1998). Adult figure types are grouped according to height and proportion. Olaitan and Mbah (1991) had analyzed figure types into four categories, namely: short and slender, short and plump, tall and slender, tall and plump. But Anyakoha and Eluwa (1999) provides a more comprehensive analysis as she identified seven figure types that are easily recognizable among women. She went further to recommend the corresponding styles of garment to choose and to avoid. The figure types, according to her, are the proportionate tall and slender, short and plump, flat chest, large bust, short neck, long neck and large hips. The best of the figure types is the proportionate. Any individual who does not fall into the proportionate figure type can be said to have a figure problem. Figure problems according to Anyakoha and Eluwa (1999) include flat chest, large bust, short neck, long neck and large hips.

Most Nigerians, both men and women, like to possess a variety of clothes such as shirts, blouses, skirts, coats, dresses, jackets etc but those that really appear fashionable endeavour to select only the clothes that match their figure types. The styles of dresses chosen by anybody with a figure problem would determine whether or not the figure faults will be hidden, exposed or even exaggerated. Figure and style are part of the principles considered by designers and makers of ready-to-wear dresses from commercial garment production. Some potential consumers especially women may find it difficult to select garments from the market due to their peculiar figure problems. The garment industry should therefore not only make necessary allowance for adjustments to their designer dresses but also provide coaching points for tailors that would undertake the adjustments.

The challenge of advertisement and control of market - Large scale garment production implies entrepreneurial investment and the success of any such business depends on popular demand for the products. In most cases advertisement in television, radios, newspapers and magazines is involved to sway the choice of consumers to particular brands especially in the face of competition with other producers of similar products. According to Fashion Encyclopedia (2008), Charles Frederick Worth (1825-1895) became the first world famous French fashion designer partly because he was also the first to create and employ the principles of design and fashion that would be called "haute couture," or "high fashion", and partly because he changed the way dresses were shown to customers by being the first designer to use living women as models, and the first to have fashion shows to reveal his new designs to customers. Evolution of innovations in advertisement of products is therefore an inevitable challenge to large scale garment producers.

Conclusion

Pattern making is an art, and a science which gives a regular sequence of event or instructions showing how a thing is to be made as in the case of a sample of cloth. Individuals with difficulty in getting fitting dress will probably derive the greatest benefit by making dresses from self - made patterns, since they may not easily get their ready-to-wear garments from the shops, or from custom-made or made-to-measure garment. It is therefore, necessary that appropriate basic patterns should be developed especially for individuals with figure problems which could then be adapted based on designs and style features. This however, needs adequate skill in pattern development. This is even made more necessary since there are no companies in Nigeria which develop commercial patterns. Studies in Nigeria (Iloeje, 1995; Igbo, 2001) have shown that there are no standard patterns for the production of dresses for women, including those with figure problems. The challenges of pattern making for large scale garment production in Nigeria are therefore enormous but could be surmounted if those interested in developing indigenous clothing and textiles technology have the will and determination.

Recommendations

1. Since accurate measurements are critical to effective and efficient pattern drafting, the teachers of mathematics should make their lessons more real by relating the topics on mensuration to real life situations such as body measurements for dress making.
2. More emphasis should be given to the practical aspects of Clothing and Textiles at the junior and senior secondary school levels in order to encourage boys and girls to develop interest in the vocation of garment making.
3. The Federal Government should establish Schools of Textile Technology; equip them properly to provide access for enthusiasts to study pattern drafting and garment making at advanced level.
4. Nigerians should learn to patronize locally manufactured textiles and this will reduce the problem of availability and affordability for foreign fabrics.
5. In Home Economics lessons in Clothing and Textiles, the study of figure types should be related to necessary adjustments that will help individuals with figure faults secure fitting garments that will make them appear presentable.

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