

UNIVERSITY OF CAPE COAST

ASSESSMENT OF DRESSMAKERS KNOWLEDGE BASE ON DARTS
AND THEIR APPLICATION IN GARMENT DESIGNING IN THE
CENTRAL REGION

DEBORAH AMOAKO ASARE

2015

UNIVERSITY OF CAPE COAST

ASSESSMENT OF DRESSMAKERS KNOWLEDGE BASE ON DARTS
AND THEIR APPLICATION IN GARMENT DESIGNING IN THE
CENTRAL REGION

BY

DEBORAH AMOAKO ASARE

This thesis submitted to the Department of Vocational and Technical Education of the College of Education Studies, University of Cape Coast, in partial fulfilment of the requirements for award of Master of Philosophy Degree in Home Economics

NOVEMBER 2015

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the results of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:.....

Date:.....

Name: Deborah AmoakoAsare

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature.....

Date:.....

Name: Dr. ModestaEfuaGavor

Co-supervisor's Signature.....

Date:.....

Name: Ms. Irene TawiahAmpong

ABSTRACT

The present nature of fashion calls for dressmakers to move along with the trend of producing innovative and creative garments that are well fitting and also appealing to their customers fashion sense. Dart which basically introduces fit in garment also serves as an asset with which a dressmaker can manipulate to create unique styles. However, casual observation made pointed to the inappropriate use of this element hence, the effect that it ought to create was rarely achieved.

This study was aimed at finding out what dressmakers know about darts as well as how they applied dart principles in garment designing. To reach this objective, the descriptive research design was employed for the study. Established dressmakers with either formal or informal training in dressmaking in some selected district in the central region were observed and interviewed. Frequencies and proportions, and inferential statistics (independent sample t-test at 0.05 alpha levels) were used for the analyses of the data.

Results in this study showed that, dressmakers could not relate well with the elements that actually defined darts when marking it out. Hence, manipulating it to create varying effects during garment designing rarely produced the desired effect. The results also revealed that dressmakers are more capable when designing garments with added fullness than dart manipulation and contouring. It is recommended that, accurately marking out darts with special reference to dart size, length, shape and location should be taught to dressmakers during workshops, seminars and general meetings that are organized by the association.

ACKNOWLEDGEMENTS

I would like to acknowledge the tremendous assistance of DrModestaEfuaGavor, my principal supervisor, who has been an inspiring source of encouragement throughout the research work. Her dedication and patience in reading every bit of this work has led to the achievement of this ultimate goal. I am beholden to her. To my co-supervisor, Ms Irene TawiahAmpong who painstakingly read through the work to correct every possible mistake as well as make vital input to this research, thank you for your time and assistance.

My sincere thanks go to Mr. Willmerford of the Ghana National Tailors and Dressmakers Association secretariat (Central region) for his immense assistance. I also appreciate the effort of all dressmakers who availed themselves for the study.

I will also like to appreciate my family members especially my parents and siblings for their support and encouragement throughout this study. My compliments also go to my fiancé, Justice GyekyeAppiah, who assisted in diverse ways to make this study complete.

DEDICATION

To my Late Mother, Mrs. Leonora AmoakoAsare.

TABLE OF CONTENTS

	Page
DECLARATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
DEDICATION	v
LIST OF TABLES	ix
LIST OF FIGURES	xi
CHAPTER	
ONE INTRODUCTION	1
Background to the study	1
Statement of the problem	5
Purpose of the study	8
Research Questions	9
Hypotheses	9
Assumption	9
Significance of the Study	10
Delimitation	10
Definition of Term	11
Organisation of the rest of the Study	12
TWO REVIEW OF RELATED LITERATURE	13
Introduction	13
History of dressmaking in Ghana	13
Forms of vocational training in Ghana	16
Conceptual framework for the Study	20

	Patternmaking	23	
	Darts		33
	Dart Principles		37
	Summary		58
THREE	METHODOLOGY		60
	Research Design		60
	Population	62	
	Sample and Sampling procedure		63
	Instruments		69
	Limitation		70
	Data Collection Procedure		72
	Data Analysis		78
	Ethical consideration		78
FOUR	RESULTS AND DISCUSSION		80
	Knowledge base of dressmakers on patternmaking		81
	Knowledge base of dressmakers on darts		85
	Application of dart principles in cutting out		90
	Differences between formally and informally trained dressmakers with the application of dart principle in garment designing.		96
FIVE	SUMMARY, CONCLUSIONS AND RECOMMENDATIONS		104
	Overview of Research Problem		104
	Summary of the Study		104
	Summary of the Findings		105
	Conclusions		106
	Recommendations		108

Suggestion for further studies	109
REFERENCES	110
APPENDICES	116
A Semi-Structured Interview Guide	117
B Observation Guide	122
C Illustration of how to take Body Measurements Accurately	128
D Pictures of sewn test designs	131
E Differences between formally and informally trained dressmakers with the application of dart principles in garment designing	136

LIST OF TABLES

Table		Page
1	Zones in selected District	65
2	Membership of selected zones and sampled size	66
3	Age Distribution of Dressmakers	67
4	Origin of skill acquisition	68
5	Measurement format used by respondents for drafting the basic block set	83
6	Direction for pressing a dart in a garment	88
7	Identification of dart use in test designs	89
8	Dressmakers' application of the dart principle in cutting out	92
9	Assessment of formally and informally trained dressmakers with the application of dart manipulation principle (design 1) in garment designing	96
10	Means, Standard Deviations, <i>T</i> -values and <i>P</i> -values for the application of dart manipulation in garment designing by two groups of dressmakers	98
11	Assessment of formally and informally trained dressmakers with the application of dart manipulation principle (design 1) in garment designing	99
12	Means, Standard Deviations, <i>T</i> -values and <i>P</i> -values for the application of added fullness in garment designing by two groups of dressmakers	100

13	Assessment of formally and informally trained dressmakers with the application of contouring principle (design 3) in garment designing	101
14	Means, Standard Deviations, <i>T</i> -values and <i>P</i> -values for the application of contouring in garment designing by two groups of dressmakers	103

LIST OF FIGURES

Figure		Page
1	Element involved in garment designing	23
2	Illustration of how darts can be stitched	34
3	Ways for making dart	35
4	Illustration of how to press a dart	36
5	Illustration for relocating dart by the slash and spread method	40
6	Converted dart designs	40
7	Illustration for converting dart into dart equivalent	42
8	Illustration for converting dart into styleline	43
9	Manipulated dart design	44
10	Illustration for front design plot and result	46
11	Illustration for back design plot and result	47
12	Equal fullness	48
13	Fullness on one side	48
14	Unequal fullness	49
15	Added fullness design	50
16	Illustration of skirt design plot and result	52
17	Chartered contoured bodice block	54
18	Classic empire design	54
19	Surplice design	55
20	Strapless design foundation	56
21	Contoured design	56
22	Illustration of bustier plot and results	58

23	Number of working experience	67
24	Level of education of dressmakers	68
25	Final pattern for dress design	75
26	Final pattern for skirt design	76
27	Final patterns for bustier	77
28	Methods use for making patterns	82
29	Cutting out methods employed by respondent at their workshop	84
30	Knowledge base of respondents on dart	86

CHAPTER ONE

INTRODUCTION

Background to the study

Read, (1995), defines a dressmaker as a person who makes clothing for private customers from pattern to finished garment, either by hand or by machine. The Collins English dictionary (2005) also defines a dressmaker as a person whose job is to make custom clothing for women with the use of pattern or an existing garment as a guide. These two definition, establish the basic function of every dressmaker which is to construct garments for women with the use of a guide. The construction of clothing can be traced as far back as 25,000 to 40,000 years ago, during the Aurignacean period (Pritchard, 2013). The material artifact that provided evidence of the process of sewing was the eye-bone needle; a bone with a hollowed-out hole and as the first needle, it has probably remained the most revolutionary technological development in the field of apparel production. The craft of sewing, according to Benson (as cited in Pritchard, 2013) is the process of attaching one object not necessarily cloth to another by using stitches. This craft existed for thousands of years before the evolution of pattern development. Early archeological findings suggest that about 50,000 years ago during the Old Stone Age, the first body covering that resembled clothing was in the form of sheep fleece, skins and natural fibers. During this age, primitive people did not require patterns for their garments. They wrapped or tied bits of these

materials around their bodies without thought to changing styles or fashion. Thus, the cloth was simply draped on the body without it being cut and sewn into garment that would conform to the shape of the human body.

Turlings(2002) have indicated that the development of dressmaking in Ghana is believed to have started during the colonial period with the introduction of wax prints and “dress” by the Europeans. As the Europeans explored and took control of parts of the country during the colonial days, so did their religion (Christianity) which aimed at civilizing and redeeming the “heathen” African (Odotei, 2008). To make civilization match hand-in-hand with evangelization, the Europeans established schools in the forts and castles where besides reading, writing and arithmetic, workshops were organized for students to acquire practical skills in carpentry, masonry, blacksmithing, shoemaking and sewing (Adu-Boahen, 2008). With respect to sewing, notable persons, who influenced the development of the craft in Ghana were, Harriet Jarvis, Grant, and Schindler.

From Ghanaians first contact with the Europeans to date, garment construction is done in most parts of the country. Jauch and Merc (as cited in Forster & Ampong, 2012) stated that during the first two decades of Ghana’s independence, the textile sub sector was a major key player which contributed significantly to employment and economic growth in Ghana. It was a popular source of employment for both men and women in the country. Presently, most Ghanaian women do not assume the responsibility of sewing for the family as they did during the colonial era. Instead, they take fabric to their local dressmakers and have clothes for all occasions sewn for themselves and their families. This way of clothing the family has been the foundation of the

fashion industry in Ghana. In the last two decades things have changed; with the demand for modern clothing on the rise, fashion industries who can't keep up with new trends lose business when dissatisfied customers turn to other dressmakers or resort to purchasing imported clothing (Turlings, 2002). Dressmakers who want to stay in business have the responsibility of juxtaposing tradition and modern day "Ready to wear" fashion in a unique way in order to satisfy and attract a wide range of customers. Keiser and Garner, (2003) also asserted that, garment producers need to produce garments that fit well and also have a professional finished look, by being knowledgeable about elements that influence shape, silhouette, and style of a garment.

According to Brown and Rice (2001), these terms; shape, silhouette, and style captures the essence of apparel design and decisions about these three terms guide the design development process. Dressmakers must therefore give careful consideration to these fundamentals for even the most basic garments. With respect to these elements, dressmaker resort to the use of darts, dart equivalents or dart substitutes to achieve desired fit and style. According to Baker (2007), darts are used to shape fabric to fit the body curves by controlling fullness or excess fabric. The wide base of a dart takes in fabric fullness so that a garment fits the narrower part of the body. Darts that may be featured in a garment includes waist darts, bust darts, elbow darts, contour darts and French darts. However, the bust darts and the waist darts according to Jeffreys (2006) are mostly used on women's garments to allow for fullness at the bust and hips, while shaping the fabric in at the waist. Fischer (2009) asserted that the overall shape of a garment is the first thing anybody sees before any other details are conveyed. Hence, the importance of

dart, which is a feature in garment that creates shape, cannot be underestimated.

Apart from darts giving shape to a fabric to fit the curves of the body, they can also be used decoratively for varying effects. For dressmakers to produce garments that fit well with the application of dart, they have to be knowledgeable about the principles that govern dart use. Hollen and Kundel (1992) insisted that anybody who is into the production of garments should have a thorough understanding of the function of darts and how darts are used to create designs. Designing with darts in garment designing are founded on three basic principles namely; Dart manipulation, Adding fullness and Contouring. In this study, these principles are collectively referred to as dart principles. These principles can be used independently or combined to give varying effects. In applying these dart principles in garment designing, a dressmaker can decide to apply the principles manually or employ the use of computer aided design (CAD) software depending on the form of training received by a dressmaker which could be formal or informal means (apprenticeship training).

With respect to manual application of the dart principles, the dressmaker develops a basic block with a set of measurement; this basic block serves as a working pattern from which other designs are derived through the application of the dart principles. With the Computer Aided Design (CAD), it is software in the apparel industry mainly used in various processes such as garment design, pattern preparation, pattern grading and marker making. According to Ondogan (1997), in using the CAD software, the main size patterns are prepared manually and then digitised by following a set of

procedures. The pattern principles are then applied electronically for varying effects.

Irrespective of the mode of application a dressmaker decides on, Fischer (2009) asserted that applications of these principles are the most creative and flexible part of pattern making. The possibilities of creating designs with these principles are endless and the designer's imagination is the only limitation. In applying these principles, darts can be relocated, turned into pleats, gathers or stylelines. Fischer (2009) indicated that these techniques do not only create fit, shape and volume, they also change the style and design of the garment. In simple terms, in-depth knowledge and appropriate application of these principles can help dressmakers keep up with fashion by producing garments that appeals to customers' fashion sense and also fit well.

Statement of the Problem

In garments designing, a garment producer can employ the use of paper patterns obtained through a manual or electronic (CAD) means or direct plotting on fabric (freehand cutting). The kind of method a dressmaker chooses to work with is informed by the level of knowledge, skills, and competence a dressmaker have as a result of the form of training he or she had received for dressmaking (Forster & Ampong, 2012). In Ghana, the main method for cutting out garment by dressmakers is the freehand method. Forster (2009) has defined this method as using an individual's body measurements to cut garments directly from a fabric and dressmakers who employ this method use different methods to cut the same design. Thus, every dressmaker generates a method which is convenient for him or her to cut out a style. This also implies that, there are no laid down rules that govern the use of this

method. According to Forster (2009), freehand cutting is the main method for cutting garments in Ghana however, some dressmakers in the industry resort to the use of patterns in cutting out garments for their customers.

The use of patterns require dressmakers to first of all build the desired style and fit of the garment onto a piece of paper before the actual cutting out is done on the fabric with the pattern as a guide. According to Forster (2009), the use of paper patterns allow the dressmaker to identify and correct any form of problem before the actual cutting out is done. With respect to freehand cutting, the dressmaker builds the style and fit directly into the fabric. Forster has asserted that, a dressmaker can easily cut wrongly and spoil the fabric if he or she is not alert and skilled.

In a study that was conducted by Forster and Ampong (2012) to compare pattern cutting skills taught in Teacher Education Universities in Ghana with what were used in local small scale garment industries, the demonstrators indicated that their clients had no problems with fit when they used the freehand cutting method. Although, the dressmakers did not qualify “fit”, dart being a basic feature which introduces fit into a garment needs to be investigated. This is based on the premise derived from casual observation. Observation made has revealed that, some custom-made garments seem to point to the improper application of the three basic dart designing principles. As a result, garments do not fit well or hang/drape properly.

The improper application of the dart principles can be attributed to the fact that most dressmakers in Ghana acquire their dressmaking skills through the informal system (apprenticeship programs) with a few, acquiring the skills through the formal system. In the informal system, the chief method used in

teaching dressmaking skills is the freehand cutting (Biney-Aidoo, Antiaye & Oppong, 2013). The training system as well as the method employed in teaching the dressmaking skills presents a number of limitations to both the established dressmaker and apprentices who are learning the skills under his or her tutelage. With the training system, established dressmakers teach their apprentices what they were taught and have perfected. These established dressmakers with time, usually find easier ways of making garments irrespective of its appropriateness and accuracy. Therefore, if a wrong skill is learnt, it is carried unto the apprentices who also with time perfect the wrong skills. The freehand cutting method that is mostly used by established dressmakers does not easily allow for experimentation to be made with darts to create unique designs and desired fit. As it has already been established, the use of darts or how it is made can easily influence the fit of a garment. Although it is easy to introduce dart into a design, making the dart to fit the contours of the body well is accomplished with special skills based on the knowledge a dressmaker has on darts. This may be lacking with most of our local dressmakers.

A number of researchers such as Sarpong, Howard and Osei-Ntiri (2011); Foster and Ampong (2012); and Biney-Aidoo "et al" (2013), who have conducted researches in the field of small-scale garment industries are focused on challenges, cutting/sewing skills and training forms, with very little done on garment producers' knowledge base on details, associated with constructional processes.

The present nature of fashion calls for dressmakers to move along with the trend of producing innovative and creative garments that are well fitting

and also appealing to their customers fashion sense. Joseph-Armstrong (2010) asserted that, for garment producers to achieve success in garment designing, they must have in-depth knowledge about design analyses, figure analyses, taking accurate body measurement, and finally, know how to apply the dart principles even in freehand cutting, in creating and cutting unique styles. All these elements come to play when a dressmaker wants to construct a garment that is unique and well fitting.

Presently, styles are getting more complicated with each passing day; from Kente cloth sewn into wedding gowns to African wax print cloths that are used to make everything for all walks of life, dressmakers have to be very knowledgeable about the fundamental elements that influence the dynamism of fashion. The Ghanaian dressmaker can do more in garment designing, if attention is paid to darts and their principles that make clothing articles unique. This research therefore assesses the knowledge base of dressmakers' on darts and the application of dart principles (dart manipulation, adding fullness and contouring) in garment designing.

Purpose of the Study

The purpose of this descriptive research was to assess how dressmakers in the central region applied what they know about dart principles (dart manipulation, adding fullness and contouring) to plot, cut and sew requested styles for their clients.

Research Questions

To help solve the research problem, these set of questions were posed to elicit answers from participants.

1. What knowledge and skills do dressmakers have about making patterns?
2. What knowledge and skills do dressmakers have about darts use in creating different effects in garments?
3. How do dressmakers use dart principles in cutting out?

Hypotheses

HO₁: There is no significant difference between formally trained dressmakers and informally trained dressmakers with the creation of designs with dart manipulation.

HO₂: There is no significant difference between formally trained dressmakers and informally trained dressmakers with the creation of designs with added fullness.

HO₃: There is no significant difference between formally trained dressmakers and informally trained dressmakers with the creation of designs with contouring.

Assumption

It was assumed that, a dressmaker's knowledge base on darts and their principles influenced how the dressmaker applied the dart principles in garment designing.

Significance of the Study

This study would be of immense importance to a wide range of people like fashion tutors, fashion student, tailors and dressmakers association, and the national board for small-scale industries.

To the fashion tutor, the outcome of this study would help them identify existing gaps in the practical application of the dart principles in the field of dressmaking so that, appropriate method of teaching these principles would be employed to get expected result.

To the fashion student, the outcome would give them an opportunity to know the realities that exist in the field of dressmaking with respect to applying the dart principles in garment designing. This study would help them prepare adequately before they enter into the apparel industry.

To the dressmakers and tailors association, the outcome would help them to identify existing gaps with the application of the dart principles. The study will enlighten members more about darts and how their principles are applied in garment designing to achieve the desired effect.

Finally, to the national board for small-scale industries, the study would help them in making decisions pertaining to garment designing when it comes to upgrading the skills of members in the apparel industry.

Delimitation

In terms of scope of topic, the study was restricted to the manual way of applying the dart principles of for varying effects. It did not address the use of computer aided design (CAD) by dressmakers. Again, the study focused on two most commonly used darts; the waist, and bust dart. These darts form the basis for all other darts; they can be combined or relocated to get other types of darts.

Due to the fact that, there are hundreds of designs that can be created by manipulating the waist and bust darts, three styles that required dressmakers to exhibit in-depth knowledge about the application of each dart principle, were the focus of the study.

To make the study feasible in terms of time available, representative sample of dressmakers were randomly selected from the dressmakers and tailors association to represent all dressmakers in the central region.

Definition of Terms

Custom-made: Describing garments made by tailor, dressmaker or couture house for an individual customer following couturier's original design (Read, 1995).

Dart: The take-up of excess fabric of a determined amount at the edge of the garment, and converging to a diminishing point. The shape of a dart is indicated by convergent lines on the finished garment (Read, 1995).

Dart principles: This refers to the three patternmaking principles and techniques applied in garment designing. They are: Dartmanipulation, Added fullness, and Contouring

Design: A specific or unique version of a style (Keiser & Garner, 2003).

Dressmaker: An individual who makes women clothing and possess the qualities of a fashion designer, as well as a pattern maker.

Established dressmaker: A formally trained or informally trained dressmaker, who have set up his or her own dressmaking workshop.

Fit: How a garment conforms to or differs from a (human) body.

Shape: An assumed appearance of an apparel.

Silhouette: The shape of clothing formed by the width and length of the neckline, sleeves, waistlines and pants or skirt.

Style: A particular design of apparel item defined by the distinct features that create its overall appearance.

Organization of the rest of the Study

The current study is divided into five chapters. The second chapter reviews literature relevant to the study. Chapter three discusses the methods used for the study. Chapter four presents the findings and the discussion of the results of the study. The last chapter, which is chapter five, provides the summary of the study, conclusions and recommendation.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

This descriptive study is aimed at assessing the knowledge base of dressmakers on the application of patternmaking principles in garment designing in the central region of Ghana. Therefore, related literature on dressmakers as well as elements that influence garment designing was reviewed. In this chapter, the literature is presented under the following headings:

1. History of dressmaking in Ghana
2. Forms of vocational training in Ghana
3. Conceptual framework for the study
4. Patternmaking
5. Darts
6. Dart principles (Designing with darts)

Under each heading, there were several issues that were addressed to help me to answer the research problems and test the hypotheses.

History of Dressmaking in Ghana

Ghana is located on the west coast of Africa and it is made up of ten regions of which central region, the region in which the study was carried out is a part. The people of Ghana have a very rich culture when it comes to their clothing (textiles, colours and styles) and the development of dressmaking in Ghana, is believed to have started during the colonial period with the

introduction of wax prints and 'dress' (Turlings, 2002). Clothing construction was introduced by the wives of white merchants and missionaries who came to the then Gold Coast (Adu-Boahen, 2008). Harriet Jarvis, Grant, and Schindler are individuals who cannot be left out when talking about the history of clothing construction in Ghana. They introduced the teaching of sewing to young girls in 1821 in a course content that is now known as Home economics. From that time to date, Home Economics (Clothing and Textiles, Food and Nutrition, and Management in Living) have been tagged as a course for females and this is evident in the gender enrollment of the course in our various educational institutions. With respect to sewing, studies by Fianu and Acquah-Harrison (1999) stated that garment production has historically been a significant area of women's work throughout the world, and especially in Ghana as part of homemaking.

According to Sarpong, Howard, and Osei-Ntiri (2011), Ghanaian men and women before the colonial era draped very little cloths called "Kyenkyen" (a "cloth" that was derived by beating and drying the back of a tree called kyenkyen) for everyday life whilst indigenous cloth such as the kente cloth and smock were reserved for special occasions due to its laborious process of production. The kente cloth as well as the smock was obtained through laborious process, carried out entirely by hand on primitive looms. According to Sarpong "et al" (2011), cloth for everyday and occasional wear was simply draped on the body without thought to changing styles. These cloths were not cut and sewn into garments that would conform to the shape of the human body. However, from Ghanaians first contact with the Europeans to date, clothing construction, thus, cutting out of pattern pieces from cloth and sewing

them to fit/conform to body shape has become part and parcel of every Ghanaian society. Women take fabric to their local dressmakers for clothes to be sewn for them for all occasions.

Presently, styles are getting more complicated with each passing day; from Kente cloth sewn into wedding gowns to African wax print cloths, that are used to make everything for all walks of life, dressmakers have to be very knowledgeable about elements that influence the dynamism of fashion.

Classification of dressmakers in Ghana

According to Acquah- Harrison (1997), Ghanaian dressmakers can be grouped into three distinct classes based on clientele. These classes are the high class dressmaker, the middle class dressmaker and the low class dressmaker who employ various techniques in cutting out garments for their customers.

The high-class dressmakers. This class of dressmakers as described by Acquah- Harrison (1997) constructs stylish garments that are of high quality for the elites in the society such as the first lady of Ghana, wives of ministers and diplomats, female TV personalities, and female heads of institutions. Most of this set of dressmakers have received formal training in dressmaking either locally or internationally.

The middle-class dressmakers. This category of dressmakers construct garments for individuals who are in the middle classes and sometimes individuals in the lower classes. Their customers are usually made up of teachers, nurses, business women, caterers, hairdressers' and market women. Dressmakers in this category mostly employ free-hand method in cutting out their garments and hardly make use of paper patterns in cutting out.

The low-class dressmakers. Dressmakers in this class often begin as itinerant seamstresses. They sew and patch torn garments. Also, they employ only the free-hand cutting method and hardly make use of any measuring or marking tools such as tape measure and chalk.

Ghanaian dressmaker can do more in garment designing if attention is paid to some fundamental elements that make clothing articles unique. I have observed that although majority of Ghanaian dressmakers fall within the middle class range, Ghanaians outside often request garments to be sewn and sent over to them. This to me indicates a potential wide market for Ghanaian dressmakers if attention is paid to some fundamental elements that make clothing articles stand out. This point is buttressed by a study that was conducted by Sarpong, "et al" (2011). In their recommendation, they stated that Ghanaian dressmakers should take vocational training and practice as key elements to perfect performance and productivity. They continued by stating that those who are in the business (dressmaking) should find it necessary to acquire training that will assist them to improve their skills to meet standards that are set in the fashion industry.

Forms of Vocational Training in Ghana

Vocational training as described by Amedoeme and Fiagbe (2013) is the process of teaching or being taught the skills for a particular job or activity. Prior to 2006, the National Board for Professional and Technician Examinations (NABPTEX) was responsible for formulating and administering examinations, certification and standards for skills and syllabus competencies for most non-university institutions. Now, the Council for Technical and

Vocational Education and Training (COTVET) is responsible for all technical and vocational education and training matters in Ghana.

According to Boateng (2012), Technical and Vocational education affords an individual the chance to acquire practical knowledge and requisite skill training needed in the job market or for immediate self employment. In a study by Amedoeme and Fiagbe (2013), it was also stated that no country can develop without quality Technical and Vocational Education and Training (TVET) sector. Despite these facts about Technical and Vocational training, many individuals in Ghana have negative perception about TVET; it is believed that individuals who pursue this form of training are shallow minded.

Over the years, three different forms of TVET have evolved in Ghana (Bortei-Doku, Doh&Andoh, 2011). These comprise the formal system, the non-formal system and the informal system. Individuals who want to pursue this form of training can opt for any of these systems depending on their goals and aspirations, expenses involved among many other factors.

The formal system

According to Bortei-Doku“et al”(2011), the formal system of vocational and technical training includes primarily time-bound, institution-based, graded, and certified training. It is offered by institutions such as the National Vocational Training Institute(NVTI), Ghana Education Service (GES) Technical Institutes, Youth Training Institutions and a variety of private Vocational training schools. Some of the courses mounted at the technical institutes are motor vehicle mechanics, electrical works, welding and fabrication, carpentry and joinery, block laying and concreting or masonry, plumbing, tailoring and dressmaking. For this form of training to achieve

maximum results, there are a number of requirements that the institution must meet. According to Bortei-Doku “et al” (2011), these requirements include:

1. Instructors must possess the right qualification and also have in-depth knowledge (both theory and practical) about the course they handle
2. Facilities and materials for training students must be adequate, the learning
3. Training environment must be conducive and the students must be disciplined and ready to learn.

Non-formal system

This form of TVET system typically has structured learning objectives, learning times and learning support but will normally not lead to certification. Workshops, short courses and seminars are all forms of non-formal learning (Bortei-Doku“et el”2011). Under this system, both non-governmental agencies and the government of Ghana have developed a number of programme to help train, improve, and support individuals and associations in the technical and vocational sectors. Among these programmes are:

1. The LocalEnterprises and Skills Development programme (LESDEP), a private-public initiative by the Ministry of Local Government and Rural Development in collaboration with the Ministry of Employment and Social Welfare. This programmeaims at alleviating poverty, especially among the youth, through training and equipping them to set up their own businesses.
2. The skills Training and Entrepreneurship Programme (STEP) which is intended to reduce poverty by providing employable skills and other assistance including micro-finance to the unemployed. Major

components of the STEP includes skill training delivered through vocational training providers, and skills enhancement for master-craftsmen and skills training delivered through apprenticeship placements.

3. The Development of Skills for Industry Project (DSIP) is an African Development Bank (AfDB) sponsored project, aimed at providing harmonized standards of training for apprentices and to improve their knowledge and skills in the Competency Based Training (CBT) method. This project is implemented by the Project Support Unit of the Council for Technical and Vocational Education and Training (COTVET).

The informal system

This system includes a wide range of flexible programmes and processes by which individuals acquire skills and knowledge from designated training venues outside of the home and, in some cases, at home. Traditional apprenticeships make up the majority of the informal sector in Ghana and according to Uwameiye and Iyamu's (2010), apprenticeship provides an opportunity for individuals who cannot afford to further their formal education to gain employable skills.

Abban and Quarshie (1993) have noted that apprenticeship training progresses in phases. According to them, most apprentices start with an introductory phase during which the novice is taught and made to do menial jobs such as cleaning the workshop or running errands. The next phase consists of getting to know all tools of the trade and, as appropriate, the materials, the ingredients and the spare parts. Meanwhile, the apprentice is

expected to observe and learn about the work. Gradually the apprentice is introduced to more complex tasks and given increased responsibility such as supervising other apprentices, dealing directly with customers, and from time to time, looking after the shop in the absence of the established dressmaker. Thus, skills, knowledge and attitudes are transmitted through observation, imitation and on-the-job experience.

With the present system of apprenticeship, established dressmakersteach their apprentices what they were taught and usually, there is little infusion of new technology and new designs (Ng'ethe&Ndua 1992). Thus, masters mostly pass on their skills and knowledge to apprentices, but rarely create new knowledge. Even though there are no formal instructions with this system which in turn limits the theoretical base of apprentices and impacts negatively on productivity, a level of education on the part of master craftsmen and apprentices are important for knowledge transmission to be enhanced (Biney-Aidoo, et al, 2013).

Conceptual Framework

It is imperative for dressmakers to be conscious of the fact that, the first thing that anybody sees before qualities conveyed by the details, fabric or texture can be appreciated is the overall shape (silhouette) of the garment (Fischer, 2009; Joseph-Armstrong, 2010; and Hollen&Kundel 1992). These authors assert that, darts are a necessary feature of a well fitting garment since they allow a two-dimensional piece of fabric to fit smoothly over a three-dimensional body.

Successful garment designing requires in-depth knowledge about certain basic elements on the part of the dressmaker. These basic elements

includes design analyses, figure analyses, taking of accurate body measurements, proper application of dart principles, technique for generating patterns or cutting out and accurate seaming (Fischer, 2009; Joseph-Armstrong, 2010). As indicated by these authors, design analyses help the dressmaker to identify the creative elements in the design by taking a critical look at it. This helps the dressmaker to determine how the basic fitting darts have been used to create the resulting design. Design analyses also help the dressmaker to determine the kind of fabric and the yardage to use. According to Hollen and Kundel (1992), the garment design and the fabric should complement each other. For example, the effect of an ordinate print fabric can be ruined by an inappropriate design that has too many seams while a very plain fabric can be enhanced by an interesting design. Also, prints with one-way design such as velvet, velveteen and corduroy will require pattern pieces to be cut in the same direction to ensure harmonious reflection of light. In such a case additional yardage, which in other circumstances would not have been necessary will be required.

With respect to figure analyses, taking of accurate body measurement and at times visual inspection of the figure helps to determine the type of figure one will be working with. Joseph-Armstrong (2010) has indicated that it is the pattern not the figure that has to be perfect although, the hang, balance and fit are affected by individual figure type. Fashion as an architecture, requires the dressmaker to understand as early as possible how garments grow from a two-dimensional concept into a three-dimensional object. Figure analyses helps the dressmaker to identify parts of the body to emphasize and why, and also device a means to camouflage unattractive parts.

Conducting design analyses and figure analyses guide the dressmaker to determine the kind of dart principle to employ. Some designs will require the dressmaker to employ any one of the three dart principles while others will require a combination of either two or all three dart principles. Determining the kind of dart principle to employ in-turn, influence the kind of technique to use to cut out the style. A dressmaker can decide to plot and cut directly on the fabric as in the case of most Ghanaian dressmakers (Forster & Ampong, 2012), or decide to use patterns that have been generated through drafting, draping, flat patternmaking, or reverse engineering. Pattern pieces will then need to be joined to form the required design for the garment. This method of joining the fabric is commonly called seaming. Seams are one of the essential connections in technical textiles. They make very flexible and safe connections for producing complex two or three-dimensional products (Danquah, 2012). LaPere (2006) also stated that seams are the basic elements that form the structure of any apparel, home-furnishing product and industrial textiles, and are the most important parameter to maintain product integrity. Perfect pattern pieces will not come out well if they are not seamed well just as perfect seams will not be noticed if pattern pieces are not well made.

Hollen and Kundel (1992), assert that for a garment to qualify as being of good fit, vertical side seams must hang straight, the hemline must be even and parallel to the floor, darts must taper and stop before the fullest part of the area that they shape, waistline seams must follow the natural waistline and should not be binding, shoulder seams must rest on top of the shoulder, and the neckline should not be tight or binding. A garment is therefore said to have a good fit when the darts, seams, and grainlines are in their proper place and

when the garment lies smoothly over the body with no pulls, wrinkles, or baggy areas. Based on the concepts of these elements that have been discussed, it can be concluded that dressmakers must exercise good judgment when it comes to making decisions on these inter-related element. This concept has been illustrated diagrammatically in Figure 1.

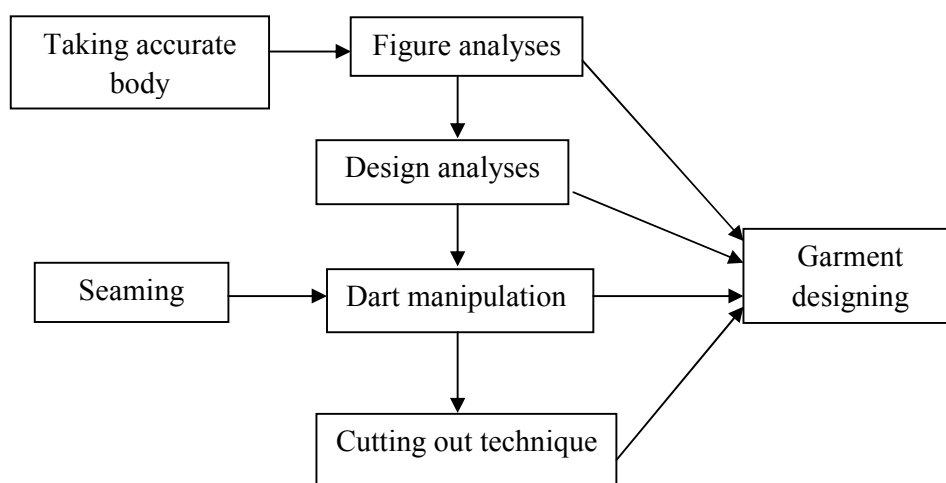


Figure 1: Elements involved in garment designing (Author’s construct).

Patternmaking

Patternmaking is the means of achieving a shape around the body/block so that although the body/block remains constant, the outline of clothe often changes dramatically in different period of fashion. This implies that, patterns are a simple outline of the front and back of a bodice and skirt, and a sleeve from which any style pattern can be developed or generated (Aldrich, 1994; Joseph-Armstrong, 2010;Shoben& Ward, 1990).From what these authors have said about patterns, it can be concluded that, patterns play a very major role in garment designing and production. Knowledge in patternmaking is thefundamental basis for successful dressmaking. Fischer (2009) stated that:

Like all craft skills, pattern cutting can at first seem difficult and intimidating. But, with a basic understanding of the rules to be followed (and broken!) the aspiring designer will soon learn interesting, challenging and creative approaches to patternmaking. To draw the right styleline in the correct position on a garment, it takes experience and practice. Designers who have been cutting pattern for twenty years can still learn something new – the process of learning never stops. This makes creative patternmaking a fascinating process (p. 24).

The major role of patterns in garment designing and construction require the pattern maker to use accurate body measurement, analyze the figure, and the design to be created very well, so that a good fit can be achieved.

With respect to techniques involved in making a pattern, it is a highly skilled craft which calls for technical ability, and a sensitivity to interpret a design with a practical understanding of garment construction. For successful dress designing patternmaking forms the fundamental step. This function connects design to production by producing paper templates for all components which have to be cut for completing a specific garment. Patterns can be formed by either a two-dimensional (2D) process or three-dimensional (3D) process. Often a combination of methods is used to create the pattern. Hollen and Kundel (1992) stated that, there are three ways of producing pattern for garments; drafting, draping, and bought or commercial pattern. In a study by Pritchard (2013), she categorized techniques for making manual pattern into

three: flat pattern making, draping and modifying (also known as reverse engineer).

Comparing Hollen and Kundel's categories for patternmaking (Drafting, Draping and Commercial pattern) with Pritchard's categories (Flat patternmaking, Draping and Modifying), draping was the only common technique that was found in both categories. Due to the fact that commercial pattern is an end product of either one or a combination of drafting, flat patternmaking, draping, or modifying, it should not be included in Hollen and Kundel's category. On the other hand, Pritchard did not state drafting as one of the ways of making patterns. According to Joseph-Armstrong (2010), drafting is a system of patternmaking that depends on measurements taken from a form or model to create basic foundation, or design patterns. From Armstrong's definition of drafting, it can be concluded that flat patternmaking is dependent on drafting hence, should not be left out when categorizing techniques for patternmaking.

Based on literature on techniques or methods of making patterns discussed, it could be concluded that, there are four major manual techniques for making patterns from which garments can be constructed. It includes three two-dimensional techniques; drafting, flat patternmaking and reverse engineer/modifying and one three-dimensional technique; draping.

Drafting. Joseph-Armstrong, (2010, p.6) stated that "pattern drafting is a system of patternmaking that depends on measurements that are taken from a form or model to create basic foundation (working patterns), or design patterns and an example is the draft of the basic pattern set. From this definition, drafting can be said to be an engineering approach whose success is based on

accuracy with which body measurements are taken, and the accuracy of the drafting instruction. Adu-Gyamfi (as cited in Forster & Among, 2012) asserted that accurate measurements are major inputs in pattern and garment cutting. Without accurate measurements, cutters will not have the right statistics to cut fitting garments. Joseph-Armstrong (2010, p. 38) stated that:

There are two different approaches to drafting a pattern; one is to rely entirely upon direct measurements taken on the figure, and the other is to rely on various measurements and proportions obtained by calculation from one or two measurements mostly from the bust, sometimes checked by height.

Due to the fact that shapes of garments in dressmaking are less standardized because of fashion, the first approach (direct measurement) is preferred to the second approach (standard measurement). Reason for this assertion is that standard measurements are developed from measurement statistics of a cross section of a specific population. These measurements are taken manually with tape measures and their accuracy largely depends on the skill of the data operator. Body scanning provides multidimensional data that have the potential to provide more reliable standard measurements for the development of standard size categories and fitting patterns (Aldrich, 2008; Ashdown, 2007). This indicates that, standard measurements are not totally dependable when it comes to drafting. In spite of this fact, the first approach (direct measurement) has some disadvantages such as:

1. Taking of accurate measurement is considered to be difficult because, it is quite difficult to establish some points at or within where to

measure on the figure like that of the waist to hip measurement and armhole depth

2. Figure, may vary slightly from day to day
3. The physical state and even the mood of an individual may affect some measurements.

When drafting a basic block, a good understanding of body shapes through figure analysis and how to transfer accurate body measurement to the pattern piece is essential. Analysis of the body informs the dressmaker as to where to locate bust point, and the amount of dart excess to incorporate when drafting the basic block to achieve a perfect fit. Joseph-Armstrong (2010) noted that “the hang, balance and fit are affected by individual figure types however; it is the pattern that has to be perfect and not the figure” (p.26). Coco, also states that “Fashion is architecture; it is a matter of proportion” (as cited in Fischer, 2009, p.11). It is important for dressmakers to understand as early as possible how a garment grows from a two-dimensional concept into a three-dimensional object. A pattern is a flat paper or card template, from which the parts of the garment are transferred to fabric, before being cut out and assembled.

Dressmakers must make it a point to record consumers’ measurement in a record book to avoid certain fitting problems. To begin the process of taking body measurement, the individual whose measurement is going to be taken must wear either a leotard or underwear, must stand barefoot and straight. Jeffreys (2006, p.24-25) recommends the following procedures for taking accurate measurement.

Height: Measure height by standing barefoot with your back against a wall or similar flat surface, place a ruler flat on the head and mark the height on the surface. Afterwards, measure the distance from the floor to the mark made on the wall as shown in Appendix c i.

Hip: as shown in Appendix c ii, measure around the fullest part of the hips, about 18-23cm (7-9 inches) below the waist, depending on height.

Waist: Tie a ribbon or string loosely around the waist and move to let it settle into the natural waistline (Appendix c iii). Use the tape measure around the marker. Do not pull the tape measure tight.

Bust and High Bust: Keep the tape measure straight across the back and measure around the fullest part of the bust and the widest part of the back (Appendix c iv a). Measure the high bust above the full Bust (Appendix c iv b). If the high bust is more than 5cm (2 inches) bigger than the full bust, use the high bust measurement instead of the bust measurement for drafting.

Bust Point: From the edge of the shoulder seam at the neck base, measure to the full bust. It should be 1 inch from the dart point (Appendix c v).

Nape to Waist: Measure from the protruding vertebra at the neck base to the waistline marker as shown in Appendix c vi.

Shoulder Length: Find the base of the neck by shrugging the shoulders then measure from the base of the neck to the shoulder edge as indicated in Appendix c vii.

Skirt Length: Measure down the back from the waistline marker to the desired skirt length (Appendix c viii).

After the body measurement of the figure has been taken, a set of instructions are followed to guide the dressmaker to construct the basic block

set. According to Joseph-Armstrong (2010), the basic block set that has been drafted (front and back patterns of bodice and skirt, and the sleeve block) are used by the dressmaker as working patterns from which design patterns will be derived. Working patterns should remain seamless for the inexperienced patternmaker for the sake of clarity and also for drafting more complex patterns where joining parts overlap. However, the experienced patternmaker may choose to work with seamed patterns.

Flat Patternmaking. Flat patternmaking is the fastest and most efficient method devised for developing design patterns that control consistency of size and fit of mass-produced garments. According to Joseph-Armstrong (2010), flat patternmaking is unique among other methods in relying on copies of previously developed patterns (working patterns) for manipulation using the slash, or pivotal/transfer methods.

The slash-spread and overlap method involves the cutting and taping of the basic pattern in order to manipulate a dart (to relocate darts, slash to overlap the pattern for more fabric, or to overlap for a closer fit) to create a new design. This technique is more versatile and lends itself to a lot of dart manipulations which are not so easy to achieve with the other technique (pivot method). In using this method for manipulating darts, the focus is on the pivot point of the dart(s) involved. This is because in slashing, the cut(s) end on the pivot point but not through the pivot point.

The pivot method does not require that the working pattern be slashed in order to change its original shape into a design pattern. With this method, the pivot point is used as a reference point. In the case of the bodice front, the pivot point is the bust tip. The pattern is pinned at this point and pivoted round

in order to transfer or combine a dart. According to Joseph-Armstrong(2010), it is a faster method and with experience, it is preferred.

Patternmaking skills are the greatest asset that a dressmaker could ever have; with it, hundreds of design can be created and each will be unique. To achieve the maximum satisfaction that the use of pattern brings to dressmakers, the basic block must be accurate for the figure it is intended for. This is because the basic block serves as a working pattern (foundation) from which other design will be derived. This fact brings to the fore why a dressmaker has to go through such tedious task (figure analysis, taking accurate measurement, and design analysis) just to construct a basic block set.

The concept of freehand cutting is based on flat patternmaking (Forster, 2009). The difference lies with the processes involved. With flat patternmaking, the dressmaker makes use of tracing papers to manipulate and transfer design details until the desired design pattern pieces are achieved. The final pattern pieces are then pinned on design fabric and cut out. With freehand cutting, the dressmaker manipulates and plot design details with the client's body measurement directly on the design fabric. According to Forster (2009), this method is commonly used by people who have a lot of experience in garment cutting and in some cases, large-scale garment producers use the method to cut patterns for the clothes they produce in bulk. In a study conducted by Forster and Ampong (2012), all the demonstrators chiefly used freehand cutting in their workshop because of its convenience. The demonstrators explained that the faster they produced garments, the better their financial gains and since the freehand cutting process was faster they all used it to remain in business (Forster and Ampong, 2012).

Modifying/Reverseengineering. Reverse engineering is sometimes referred to as garment deconstruction or a knock-off (Pritchard, 2013). With this process, patterns are made from an existing garment. The garment is taken apart, analyzed and the patterns pieces are made. A dressmaker can decide to add or take out some details from the original design. The most important thing is for the desired silhouette to be achieved. Pritchard (2013) when discussing this technique in her work, based on her experiences said that, to modify a pattern or an existing garment for a new design, an appropriate existing pattern or garment that is similar in silhouette needs to be selected. She also said that, this technique may not require as many pattern cutting skills but rather, knowledge of how a garment is constructed and an understanding of key measurement points on the body since the fundamental principles needed for a garment to fit well still apply to this technique.

Draping. In the three-dimension (3D) patternmaking process, draping is one of the oldest methods used to generate a pattern (Lindqvist, 2013). In a study by Pritchard (2013), she stated that draping, which is also referred to as toiling, requires working on a dressmaker's stand/mannequin. The word toiling comes from toile which is a French word which means cotton or linen and has since become a word that is used in the apparel industry to denote mock-up or try-out garment. In the traditional draping process, a garment is produced by molding, cutting and pinning fabric to a mannequin or individual. Style lines and constructions details of the drape are carefully marked and removed, fabric pieces with the construction and style details are generated and then, the fabric pieces are laid flat over pattern paper and traced. The

pattern is finalized by adding directional markings such as grainlines, notches, buttonholes, correct seam and hemallowances and facings.

Pritchard (2013), in her description of this technique, stated that the cloth used for draping on the form need to be of similar characteristics as the cloth intended for the finished work. She continues by stating that, cloth such as cotton muslin or calico is often used for this technique because of its affordability in terms of price and variety in terms of weight. Draping is especially helpful when developing intricate garment styles or using unusual fabric. Lindqvist, (2013), describe this technique as an artistic approach and from all indication, one has to be creative, possess a critical eye for balance and proportion, and have sensitivity to fabric characteristics in order to be successful with this technique.

Paper patterns are very useful to every dressmaker. Irrespective of the kind of technique a dressmaker decides to employ, each has its set of advantages and disadvantages but from all indication, their advantages outweigh their disadvantages. Some of the advantages of paper pattern include

1. There is no risk of the material being wrongly cut with its use.
2. It is a better method of learning for beginners than cutting the material directly.
3. It can be preserved and used whenever required.
4. Adjustments can easily be on the paper pattern to ensure perfect fitting.
5. Changes in the design with the use of paper patterns are possible. For example the basic sleeve can be adapted to puff or bell sleeve.

6. It enables one to cut a garment with a minimum amount of fabric because it is possible for the dress designer to try the layout or placement of pattern pieces in an economical way.

Darts

Darts are triangular folds of fabric that are stitched to control fullness or take in excess fabric to create shape on a garment to fit the body contours (Baker, 2007; Fischer, 2009;Jeffreys, 2006). Mckillop, (n.d) is of the view that if we were all shaped like cartoon characters after they are run over by a steamroller, we wouldn't need darts, but we are shapely with many curves.Darts are a necessary feature of a well-fitting garment since they allow a two-dimensional piece of fabric to fit smoothly over three-dimensional bodies.

Darts are used to shape fabric to fit the curves of the body. Sometimes, darts are used decoratively to provide a design line by stitching the dart together end to end or stitched to a zero point/pivotal point such as the bust point to fit the body. They are typically found in the bust, waist and hip areas, where the body is most contoured.It is therefore very important to be accurate when determining dart size, length and shape; marking; stitching; and pressing darts.

Determining dart size, length and shape

With respect to dart size,Hollen and Kundel (1992) state that, the size of the dart is determined by the angle at the tip so, the larger the body curve, the larger the fitting dart must be. As the angle becomes larger, the bulge made by the dart also becomes larger. It is important for dressmakers to note that,

dart size does not depend on dart length but rather, dart intake. In other words, short darts are not necessarily small darts.

In terms of dart length, darts must be long enough to reach the bust circle and they may be lengthened to reach to the bust point to take up some of the ease that is normally allowed. Extending dart length to the bust point makes the garment fit more snugly. It is important for dressmakers to note that, all fitting darts of the bodice front must extend from the seamline to bust circle as the minimum dart length and to the bust point, and not beyond, as the maximum dart length. Darts that extends beyond the bust point tends to flatten the breast of the wearer. In determining the dart shape, a dressmaker can decide to stitch the dart straight, curved, or inward. According to Baker (2007), the waist and bust darts can be stitched straight, curved outward (convex), or curved inward (concave) as shown in figure 2, for varying effects.

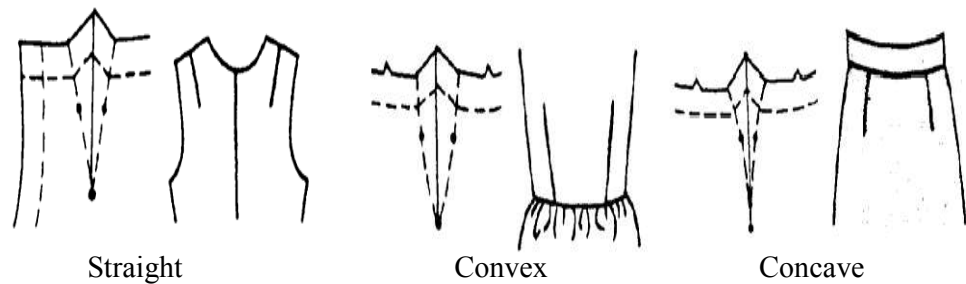


Figure 2: Illustration of how darts can be stitched (Baker, 2007)

Straight line darts are used for most flat pattern work because paper cannot be folded around a curve. With respect to stitching darts that are curved outwards, the dressmaker achieves a garment that fits more snugly under the bust. Darts stitched and curved inwards, gives more room for rounded stomach.

Marking darts

Darts may be marked by using dressmaker's tracing paper and wheel, tailor's tacks, chalk or soap slivers, marking pencils or pens, pins, or short snips (Baker, 2007). The method used depends on the fabric and the skill of the dressmaker. Apart from the type of fabric and skills of the dressmaker, it is important to always check the marking method on the fabric scrap in order to be sure if the marking method will wash out without damaging the fabric. In order to ensure that darts are of the same length on each side, mark the end of the dart with a pin or cross marks. Of the three methods for marking darts, pin marking method saves time provided pin marking is suitable to fabric.

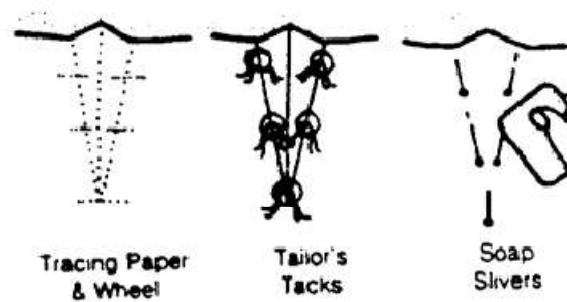


Figure 3: Ways for marking darts (Baker, 2007)

Due to the fact that, darts are part of the pattern design to fit a garment to the body, dressmakers have to make sure that, darts after they have been marked are correctly positioned on the figure. According to Baker (2007) darts should be directed toward the fullest part of the body curve and if the form or individual have a large body curve, two small darts will usually fit better than one large dart. It is always important for the dressmaker to check dart placement and make any necessary adjustments such as lowering/raising the dart or shortening/lengthening the dart before permanently stitching and pressing.

Pressing dart

It has already been established that darts provide shape to a piece of fabric and transform it from a two-dimensional piece into a three-dimensional piece. To bring out this effect, the dressmaker, after stitching and finishing the dart end must carefully position these curves over a tailor's ham or the end of the ironing board when pressing (Baker, 2007). It is important to press darts only after the dressmaker is sure they are correctly positioned on the body.

Darts must be pressed before they are crossed with another line of stitching and when pressing, the fabric must be protected with a press cloth or the plate of the iron must be protected with sole plate. Like seams, darts should first be pressed, as they are sewn, to set the stitches. To get a sharper pressing of the dart line, press darts in the opposite first (Figure 4a) and to prevent a ridge from showing on the right side as a result of pressing, the dressmaker can slip paper between the garment and the dart (figure 4b). If a dart is bulky, slash and press open with the point pressed flat (Figure 4c).

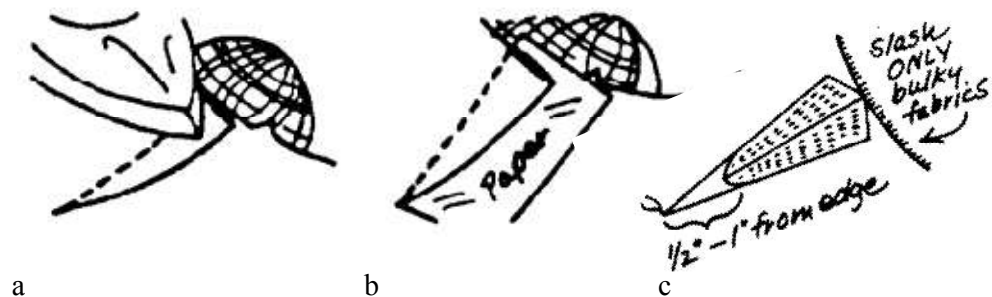


Figure 4: Illustration of how to press a dart (Baker, 2007)

After going through all these processes for constructing the dart, the dressmaker must analyze it for accuracy, based on some established standards. According to Baker (2007), a well-constructed fitting dart should conform to the following standards:

1. Be directed toward the body curve.

2. Usually end $\frac{1}{2}$ to 1 inch from the fullest part of the body curve.
3. Be tapered so it is smooth and free of puckers.
4. Be even and smooth in appearance.
5. Be pressed before being crossed by another line of stitching, and after the garment has been fitted. Uncut horizontal darts are usually pressed down; uncut vertical darts are usually pressed so the fold is toward the center front or center back.
6. Have threads secured at both ends by tying a knot, lock stitching, or backstitching (use only on medium to heavy fabric or in seamline).

Selected darts for the study.

According to Jeffreys (2006), there are several types of darts and they include Waist darts, Bust darts, French dart, Elbow darts, Dart tucks, and Contour darts. The Waist darts and Bust darts were selected for the study due to the fact that they are the most commonly used darts and they can be manipulated to form other types of dart such as dart tucks and contour darts.

The Waist darts. According to Jeffreys (2006, p. 126) “the waist darts are used on skirts, trousers, and dresses to shape the fabric in at the waist to allow fullness at the hips.” There are usually two waist darts at the garment front and two or four at the garment back

The Bust darts. As stated by Jeffreys (2006) “bust darts add fullness at the bust. Single bust darts which begin at the underarm side seams can be employed for a semi fitted effect” (p. 126). Double bust darts; one at each underarm and the others running up either side of the waist seam can also be used by the dressmaker for a fitted effect.

Dart Principles (Designing with Darts)

Joseph-Armstrong (2010) has stated that, there are three major principles and technique upon which garment designing with darts are based. These three principles are Dartmanipulation, Adding fullness and Contouring. These principles can be used independently or combined to give varying effects. According to Fischer (2009), application of these principles are the most creative and flexible part of pattern cutting. The possibilities are endless and the designer's imagination is the only limitation. Darts can be turned into pleats, gathers or style lines. These techniques do not only create fit, shape and volume, they also change the style and design of the garment. In order for a dressmaker to determine which part of the body to emphasize and why, the model must be analyzed so that the appropriate principle will be applied to construct a befitting garment, and if necessary, supported and structured to give expression to the body.

Vincent Van Gogh (as cited in Fischer, 2009, p. 6) stated that "Do not quench your inspiration and your imagination; do not become the slave of your model". Dressmakers should not be intimidated by the figure type or the kind of fabric they work with but instead, they should be guided by these two elements. It is every dressmaker's responsibility to give expression to the body, therefore they must let the cloth and the figures which they will be working with guide every decision they make. In garment designing, there are three processes involved in creating design patterns with dart principles.

The first process for creating design patterns using the working pattern is for the dressmaker to analyze the design she wants to create. This helps the dressmaker to identify the creative elements in the design (Joseph-Armstrong, 2010). In terms of applying the principle of flat pattern, design analysis

consists of examining a picture or sketch to determine how fitting darts have been used. The dressmaker has to explain what has happened to these two fitting darts (waist and bust darts) when he or she is analyzing the design (Hollen&Kundel, 1992). These darts must be accounted for. If the analysis is wrong, the design pattern will be wrong.

According to Joseph-Armstrong (2010), the second process calls for the dressmaker to identify which of the three major principles and technique to apply in creating a pattern shape that will then be transformed to fit a three-dimensional figure.

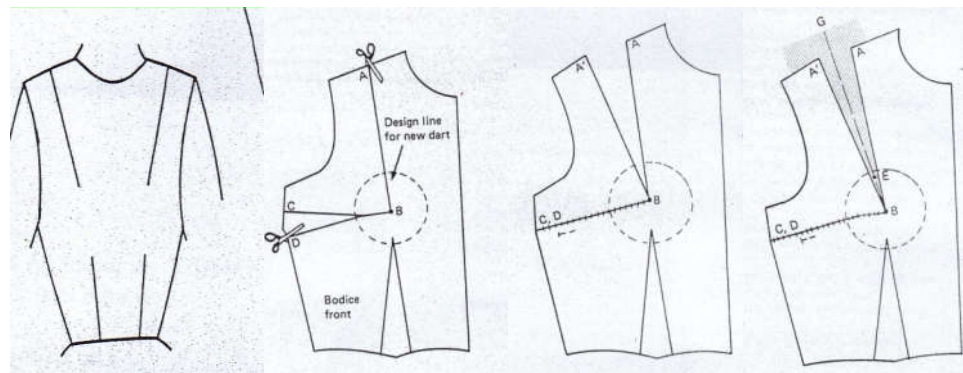
The third process requires the dressmaker to manipulate the working pattern for the desired result. During this process, he or she decides on the kind of technique (slash or pivot) to employ for the desired effect. It is however important for dressmakers to note that, unlike some designs which can be achieved by either the pivot or slash method, there are some specific designs which require a specific technique.

Principle One: Dart Manipulation

Dart manipulation is a useful and interesting tool for a pattern maker for creating interesting, innovative dart placements and style lines. In the application of this principle, some authors (Hollen&Kundel, 1992; Joseph-Armstrong, 2010) have outlined some basic foundations that are aimed at assisting pattern developers (dressmakers) to achieve different style effects. Dart can be transferred to any location around the pattern's outline from a designated pivotal point without affecting the size or fit of the garment. Hollen&Kundel (1992) have indicated that the generally accepted placements

of darts on the bodice are at the waist-line, side seam, armhole, shoulder, neckline and center. To relocate a dart or darts, the dressmaker should:

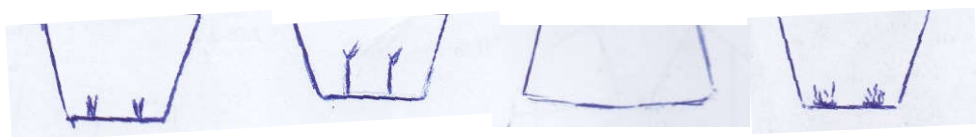
1. Study the design he or she wants to create and decide which dart (or darts) of the basic pattern must be moved. For example, the design might indicate that the underarm dart must be moved as depicted in the design of Figure 5.
2. Decide on the exact location of the new dart. For example mid-shoulder
3. Employ either the slash or pivot method to relocate dart by following a set of procedures.



Design Step 1 Step 2 Step 3

Figure 5: Illustration for relocating dart (underarm to mid-shoulder) by the slash/spread method (source: Hollen&Kundel, 1992)

The dart excess (space between the dart legs) can be converted into gathers, pleats, tuck darts, cowls, flare (unstitched dart legs), or ease in the armhole for casual garments as illustrated in Figure 6. The creative use of the dart excess is what dressmakers refer to as a dart equivalent.



Pleat

Tuck pleat

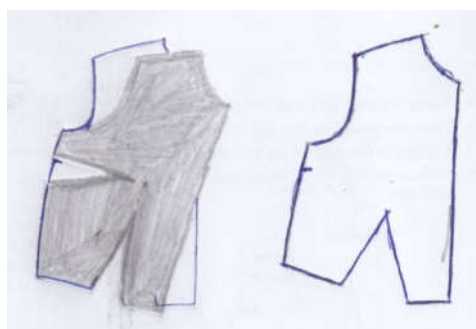
Flare

Gathers

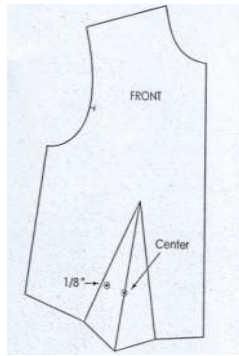
Figure 6: Converted dart designs (source: Hollen&Kundel, 1992)

It is important for dressmakers to know the difference in stitching a tuck-dart (a partially stitched, inverted dart), a pleat (unstitched, folded dart held securely along the joining seamline), flare (an open, unstitched dart) and gathers (folds in garment held securely along the joining seamline). This is because the difference in effect (style) is dependent on how the dart equivalent is stitched (Joseph-Armstrong, 2010). To convert dart excess into tuck-dart, pleat, flare or gathers, the dressmaker should:

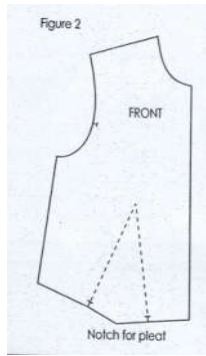
1. Study the design he or she wants to create and decide if dart (or darts) of the basic pattern must be combined, moved or divided before being converted. In the case of the illustrated designs in figure 6, the underarm dart was combined with the waist dart.
2. Decide on the exact location of the new dart equivalent. In the case of the illustrated designs in figure 6, dart equivalent is at the waist section
3. Employ either the slash or pivot method to transfer dart as required by the design (step 1 of Figure 7).
4. By following a set of instructions, convert darts into dart equivalent (step 2 of Figure 7).



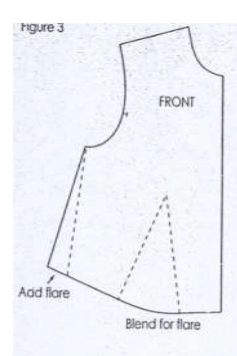
Step 1



Step 2. Tuck dart



Pleat/gathers

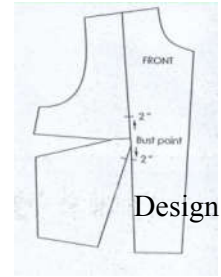
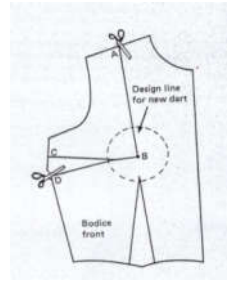


Flare

Figure 7: Illustration for converting darts into dart equivalent (source: Hollen&Kundel, 1992)

Darts can be converted into stylelines. It is important for dressmakers to know that, stylelines fall into two classes; (a) those that replace the dart legs with style seams by crossing over the bust point or within 1 inch of the bust, and (b) those that do not cross the bust point. The design used for illustrating how to convert darts into stylelines is associated with the first class (design of Figure 8). To mark darts, the dressmaker should:

1. Study the design he or she wants to create and decide where the styleline must end.
2. Draw the styleline from waist dart to where the styleline must end. Make sure to crossmark for ease control notches (2 inches above and below bust point). (Step 1 of Figure 8).
3. Employ the slash method to transfer the underarm dart to the mid-shoulder as illustrated in step 2 of Figure 8. Separate the pattern pieces then follow a set of instructions to complete panel pieces.



Subsequent plot and result

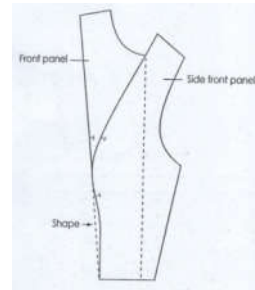
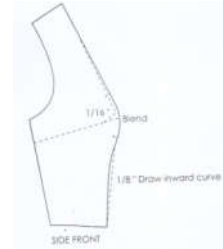
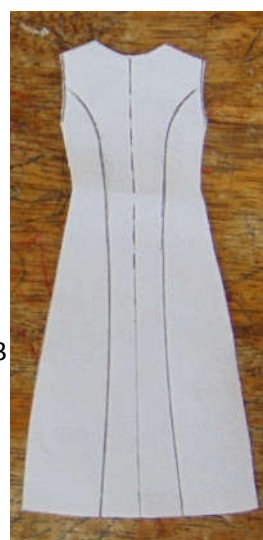


Figure 8: Illustration for converting dart into styleline (source: Hollen&Kundel, 1992)

Several authors (Hollen&Kundel, 1992; Joseph-Armstrong, 2010) have stated that darts can be manipulated from a one-dart working pattern or a two-dart working pattern depending on the kind of design one wants to construct. The difference between the one-dart pattern and the two-dart pattern is that, the working pattern of one-dart series has only one dart whereas the working pattern of two-dart series has two darts (both waist and bust dart). The design that was adopted under this principle for the research (Figure 9) was derived from a two-dart working pattern and it features an A-shape princess/paneled dress.



Front view Back view

Figure 9: Manipulated dart design (Source: Author's construct)

Design analysis. The front of the design features a princess styleline that runs from the mid-shoulder through bust point to the hemline. This was achieved by extending the waist dart to the bust point and transferring the underarm dart to the mid-shoulder. The mid-shoulder dart was then joined to the extended waist dart with a slight curve at the bust point. The lower end of the waist dart was extended to the hemline. With respect to the back of the design, it also features a princess styleline that starts from the mid-armhole through dart point to the hemline. This was achieved by extending the waist dart to the bust point and transferring the shoulder dart to the mid-armhole. The mid-armhole dart was then joined to the extended waist dart with a slight curve at the bust point. The lower end of the waist dart was extended to the hemline.

Method for plotting the design. With respect to the front design, dressmaker should:

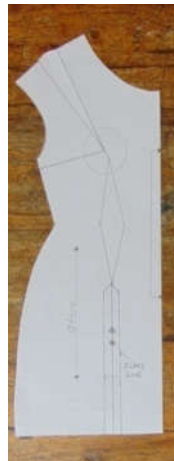
1. Start with a paper copy of the basic sheath front pattern with no seam allowances.
2. Extend the waist fitting dart to the bust point. Make the side line curve inward from the tip to the bust point (step 1).

3. Use the slash method and move the bust dart to the middle of the shoulder seam and crossmark for notch (step 2).
4. Draw a guideline from the lower end of the waist dart to the hemline; Make it parallel to center front and crossmark for notch (step 2).
5. Draw slash lines for flare on each side of the guideline (step 2).
6. Separate the pattern into two pieces. Clip the waist dart at the center, and fold it under the front pattern piece (step 3).
7. Slash and spread for the amount of flare, desired. True and blend pattern pieces to complete panels (step 4).

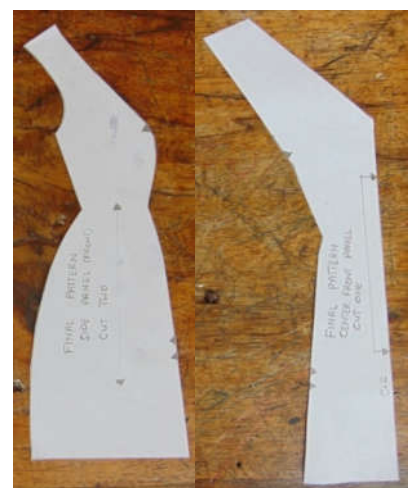
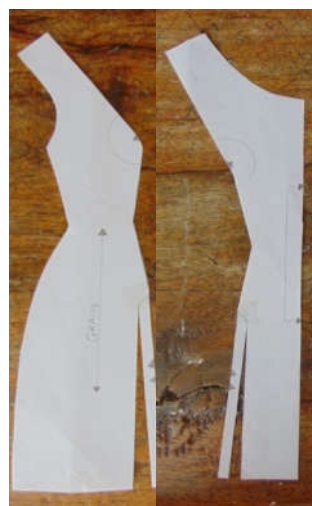
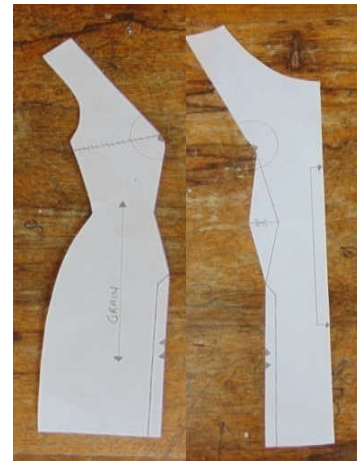
It is important for the dressmaker to note that the minimum flare for a basic princess style with a straight silhouette is One-half inch (1.3 cm) at each slash. Maximum flare for the basic princess style is 2½ - 3 inch (6.4 to 7.6 cm).



Step 1



Step 2



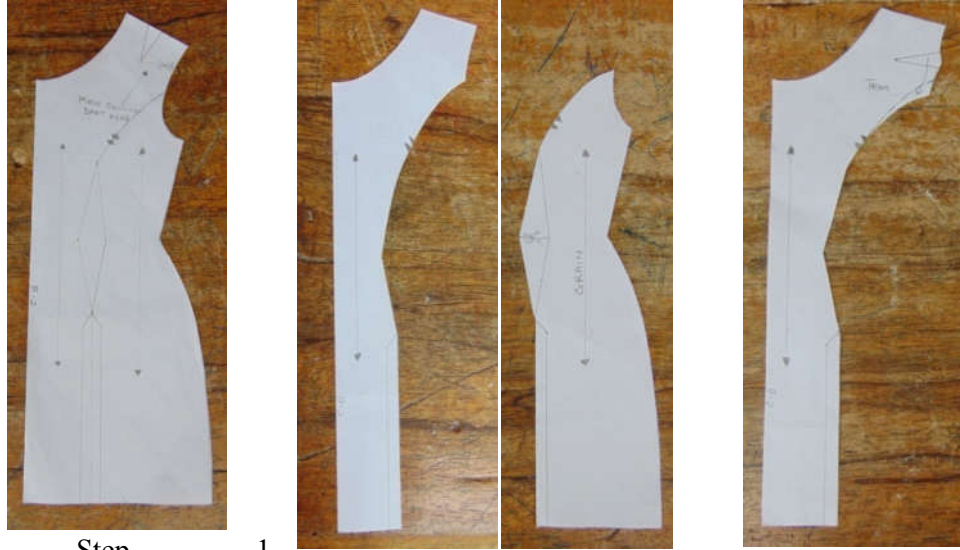
Step 4

Final pattern

Figure 10: Illustration for front designplot and result (Source: Author's construct)

With respect to the back design, the dressmaker should:

1. Start with a paper copy of the basic sheath back pattern with no seam allowances.
2. Extend the waist fitting dart to the mid--armhole. (step 1).
3. Draw a guideline from the lower end of the waist dart to the hemline; Make it parallel to center front and crossmark for notch (step 1).
4. Separate the pattern into two pieces accordingly. Clip the waist dart at the center, and fold it under the back pattern piece (step 2).
5. Use the slash method and move the shoulder dart to mid-armhole. To remove dart excess from mid-armhole, draw the dart length and width along styleline of back panel and trim excess from the pattern (step 3).
6. Slash and spread for the amount of flare, desired. True and blend pattern pieces to complete panels (step 4).

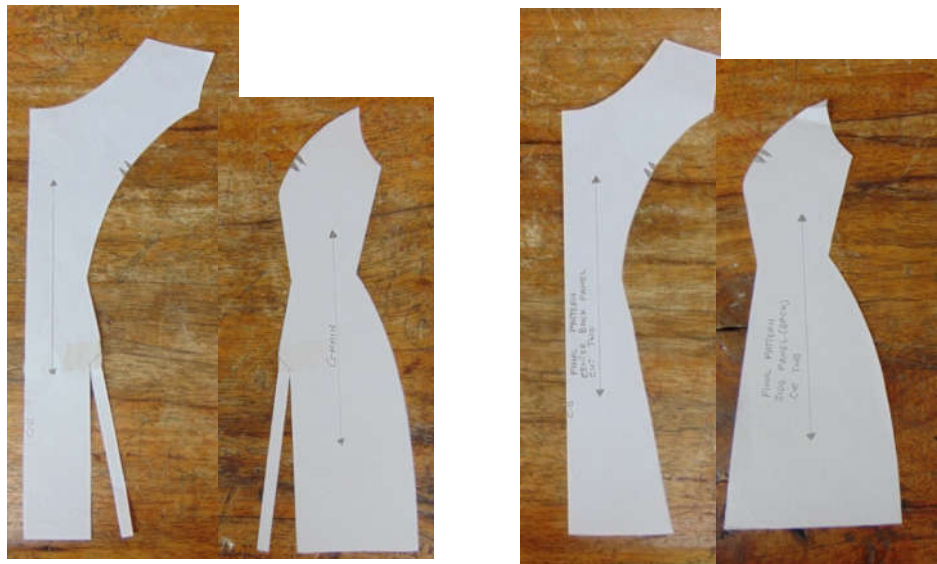


Step

1

Step 2

Step 3



Step 4

final pattern

Figure 11: Illustration for design (back) plot and result (Source: Author's construct)

Principle Two: Added Fullness

This principle is applied when the design depicts an increase fullness that is greater than the dart excess (Aldrich, 1994; Hollen & Kundel, 1992; Joseph-Armstrong, 2010). In applying this principle, the length and/or width within the pattern's frame where fullness is needed is achieved by employing the slash and spread technique.

A dressmaker can also decide to add to the outside of the pattern's frame in order to increase the amount of fabric in a garment or change the silhouette of the garment. Joseph-Armstrong (2010) has asserted that the dressmaker can decide to add:

1. Equal fullness where opposite sides of a pattern are spread equally, to increase fullness to top and bottom as depicted in Figure 12.

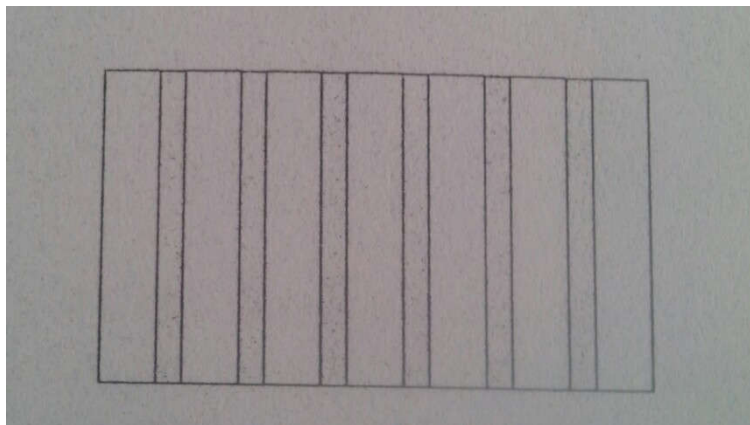


Figure 12: Equal fullness (Source: Joseph-Armstrong, 2010)

2. Fullness on one side where one side of a pattern is spread to increase fullness, to form an arc shape at the top and bottom as shown in Figure 13.

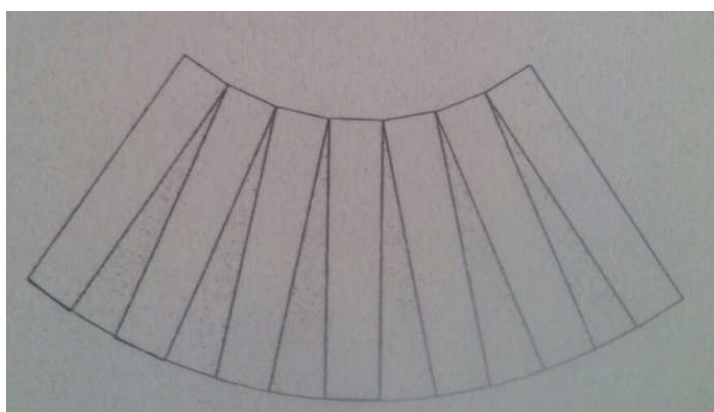


Figure 13: Fullness on one side (Source: Joseph-Armstrong, 2010)

3. Unequal fullness where one side of the pattern is spread more than the other to form an arc shape at the top and bottom as illustrated in Figure 14.

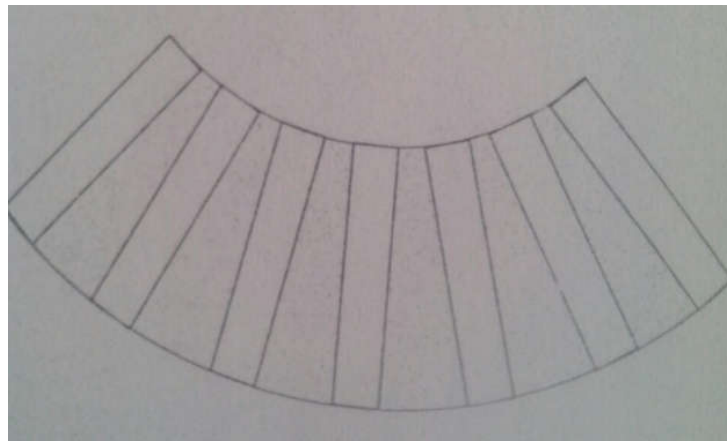


Figure 14: Unequal fullness (Source: Joseph-Armstrong, 2010)

Fullness may appear in the form of gathers, pleats, drape, cowls, or flares. According to Hollen and Kundel (1992), fullness from the basic dart is always directed to the bust. With this basic information, a dressmaker can identify added fullness design if:

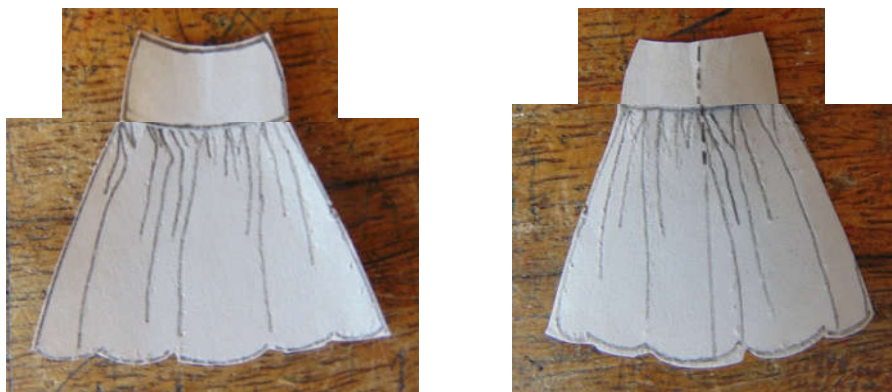
1. fullness passes through the length or width of the garment.
2. fullness is directed away from the bust
3. the garment extends beyond the outline of the figure.

Method for Plotting Pattern for Added Fullness. Added fullness is plotted as a series of straight slash lines drawn across the pattern in the direction the fullness appears on the design (horizontally, vertically, or on an angle). Various researchers (Aldrich, 1994; Hollen & Kundel, 1992; Joseph-Armstrong, 2010) have stated that when a pattern is being prepared with this principle for a design, the beginning and end of each slash line depends on where the fullness begins and ends. The excess dart is often absorbed into the added fullness. To determine the amount of added fullness desired, give

consideration to the fabric type. Light-weight and loosely woven fabrics like cottons and chiffons for example may require more fullness than bulky, closely woven fabrics. Using a 28-inch waist as an example, added fullness may equal:

1. One and one-half times the measurement ($28'' + 14'' = 42''$)
2. Two times the measurement ($28'' + 28'' = 56''$)
3. Two and one-half times the measurement ($28'' + 28'' + 14'' = 70''$)

The design that was created with this principle for the research constituted a flared skirt.



Front view

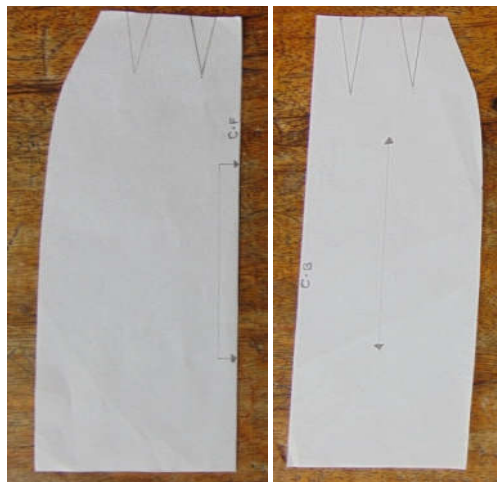
Back view

Figure 15: Added fullness design (Source: Author's construct)

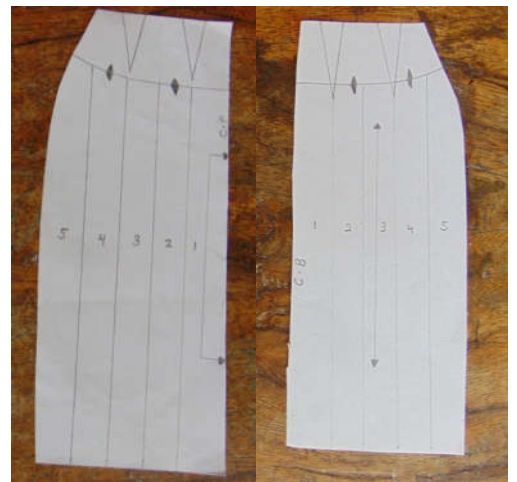
Design analysis. The design features a gathered skirt with a yoke. The yoke is about 3 ½ inches down from waistline and it is attached to an equally flared skirt. This was achieved by plotting the yokeline to divide the skirt block into two. The upper section was then separated from the lower section. Fitting darts were closed to give a close fitting yoke and the lower section was equally spread out.

Method for plotting the design. To plot the design, the dressmaker should:

1. Trace front and back patterns of skirt (step 1).
2. Plot yoke (example 3½ inches below waist). Draw yokeline with waistline (step 2).
3. Draw slash lines below the yoke and label or number (step 2).
4. Cut and separate yoke from lower skirt (step 3).
5. Cut through front slash lines and place sections in sequence then spread equally across the paper. Secure each piece in place. Trace out and Blend for a perfect hemline (step 4).
6. Close darts and trace front and back yoke on and mark notches. Blend across yokeline for a perfect curve (step 5).



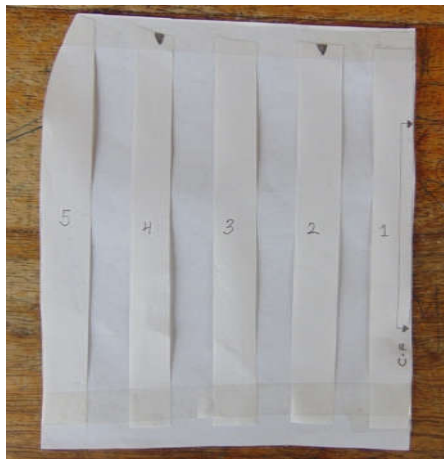
Step 1



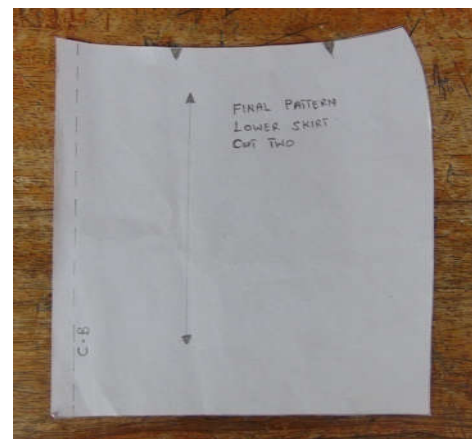
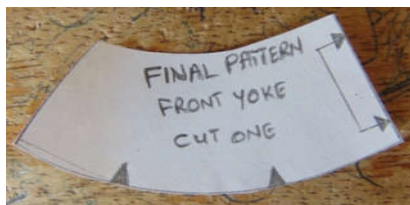
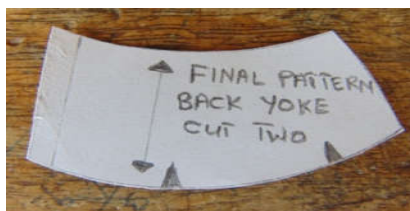
Step 2



Step 3



Step 4 Step 5



Final pattern

Figure 16: Illustrations of skirt design plot and results (Source: Author's construct)

Principle three: Contouring

This principle is applied if the dressmaker wants to create a design that fits the contours of the upper torso. In using this principle, the pattern must be reduced within its frame to fit the dimensions of the body above, below, and between the bust and shoulder blades (Joseph-Armstrong, 2010). Contour designs follow the contour of the body rather than bridging the hollow areas around the bust and shoulder blades. Designs under this principle include the

empire styleline (contouring under the bust), surplice (contouring over and under the bust), strapless bra top (contouring over, under, and at times between the bust), and cut out armholes and necklines (contouring above the bust).

The Contour Guide Pattern. Every dressmaker who wants to apply the third principle of flat pattern must be knowledgeable about the contour guide pattern. According to Joseph-Armstrong (2010), the contour guide patterns are tools that help the dressmaker to circumvent fitting problems before they are incorporated into the design. These patterns are charted with guidelines that indicate the amount of excess to be removed from stylines or darts for a closer fit. The guidelines are labeled by design types and it also represents the measurements that exist between the garment and the hollow areas of the figure (above, below, and between the bust mounds). The back bodice for contoured designs is charted for designs that have low necklines and strapless garments.

To construct the contour guide patterns, the dressmaker must follow a set of instructions that will aid him or her to develop a block for the intended design. It is however advisable for the dressmaker to develop a contour block that contains all the guideline as shown in Figure 17 and trace out the desired effect.

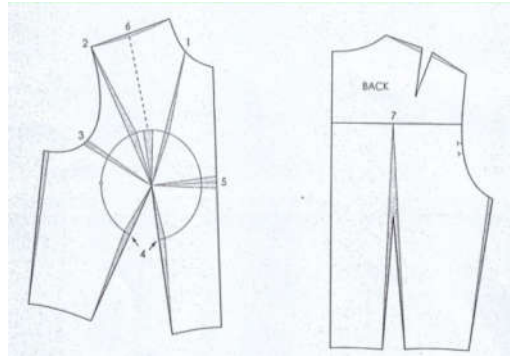


Figure 17: Charted contoured bodice block (Source: Joseph-Armstrong, 2010)

The classic empire. The classic empire is a popular styleline found on many types of garments. It is distinguished as a styleline crossing under the bust separating the pattern into two parts. The lower section is called the midriff. To emphasize the contour under the bust, the midriff fits close to the body and controls the fit of the upper garment. The empire styleline may or may not continue to the bodice back (Joseph-Armstrong 2010). For design variations the styleline can be drawn in many directions after crossing the bust.

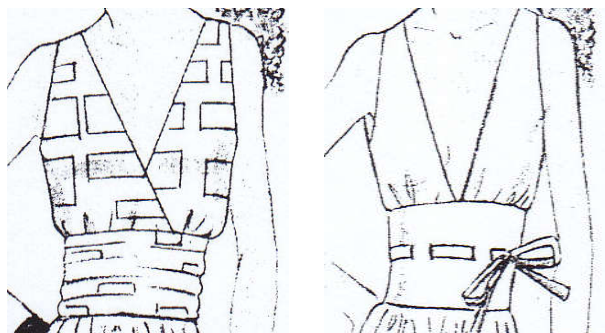


Figure 18: Classic empire designs (Source: Joseph-Armstrong, 2010)

Surplice Designs. These are forms of designs that are achieved by applying the principles, associated with contouring. Surplice designs (or wrap) have right and left sides that cross over each other. The underneath

section of a lapped side can be the same pattern shape, or can be controlled by a dart where as the overlapped section may be designed as gathers, pleats or tucks (Joseph-Armstrong, 2010). To construct a design that falls within this category, the dressmaker will need a set of instructions to aid him or her.

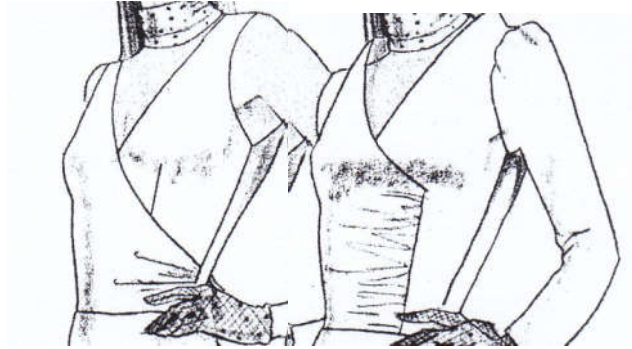


Figure 19:Surplice designs (Source: Joseph-Armstrong, 2010)

Strapless Garments. Strapless garments are garments that contour the bust area and terminate at varying distances up, or at level, and remain in place when worn. Several authors (Hollen&Kundel, 1992; Joseph-Armstrong, 2010) have asserted that strapless garments require undersupport for security. With respect to strapless garments, there are three basic strapless foundations which are very popular for constructing day dresses, evening wear, gowns casual bedtime wear, and wedding dresses. These foundations are: Princess bodice foundation, Torso foundation and Bra-top empire foundation. These foundations are contoured above, below and in between the bust. However, each has a distinct way of being plotted and cut out. Apart from these three, there are other strapless foundations which include the bustier, corselet, and waspie which also have special characteristics (Joseph-Armstrong, 2010). Foundations mostly employed in constructing theatrical costumes, period costumes and dance wear is based on these other foundations.

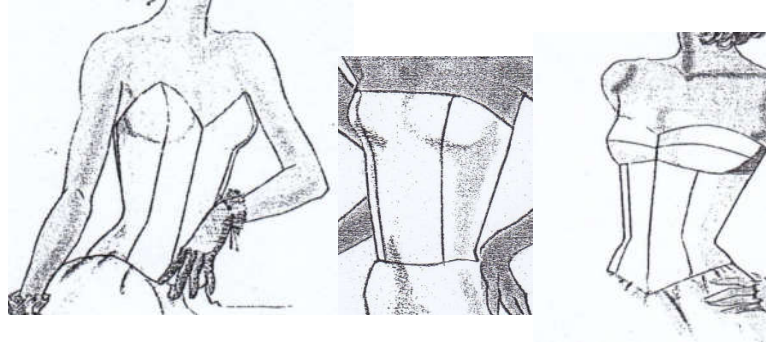
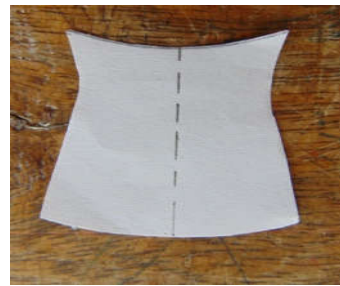


Figure 20: Strapless design foundations (Source: Joseph-Armstrong, 2010)

The design that was created by using the third principle of pattern making was based on the princess bodice foundation.



Front view



Back view

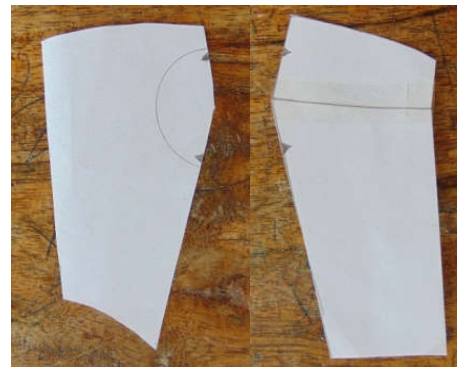
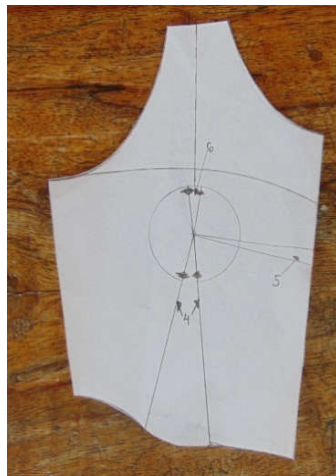
Figure 21: Contoured design (Source: Author's construct)

Design Analysis. The front design features a princess bodice foundation that is contoured above, below and in between the bust. The back is cut low.

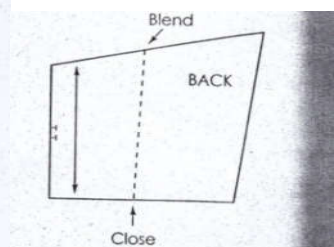
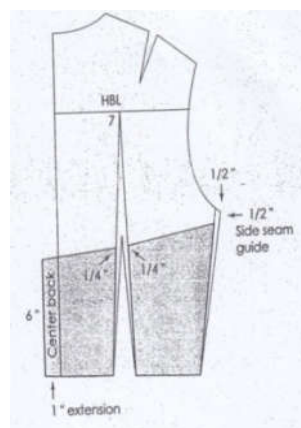
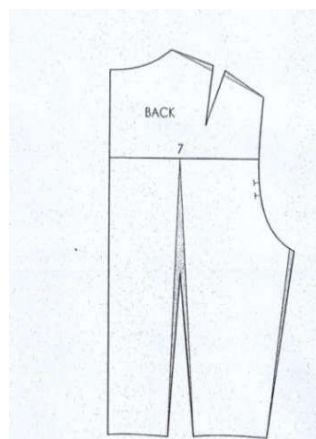
Pattern plot and manipulation. To plot the design, the dressmaker should:

1. Trace the front bodice and transfer contour guidelines 4, 5 and 6 (step 1).
2. Draw strapless styleline as required by the design. Mark notches 2 inches up and down from bust point (step 1).

3. Cut princess pattern from paper. Close the center front dart and trace the pattern. (step 2).
4. With respect to the back, trace the back pattern; include guideline 7 to the high bust level (step 3).
5. Draw back strapless line as required by the design (step 3).
6. Cut the strapless back from the paper and close the dart legs and trace the pattern. Draw the grainline straight or on the bias (step 4).

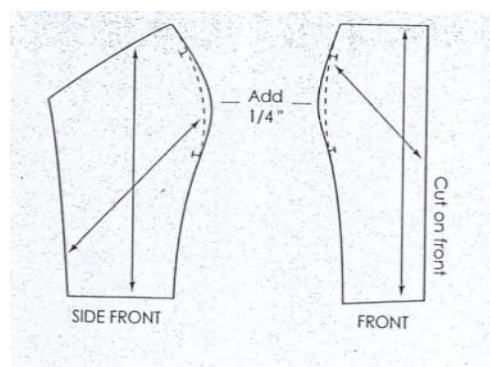


Step 1 Step 2



Step 3

Step 4



Final patterns

Figure 22: Illustrations of bustier plots and results ((Source: Joseph-Armstrong, 2010))

Summary

As evident from the preceding information, darts and its use in garment designing is a craft which is governed by three basic principles (dart manipulation, added fullness and contouring). For dressmakers to produce a well fitting garment that will appeal to their customer's fashion sense, rules governing the use of these basic principles must be well observed. However, lack of understanding of these basic principles limits dressmakers from maximizing the use of darts in garment designing.

Current research works in the area of clothing and textiles have overlooked the use of dart which is a basic element that introduces shape and influence the fit of a garment. Forster and Ampong (2012) focused on pattern cutting skills in small scale garment industries and teacher education universities in Ghana, Sarpong "et al" (2011) focused on globalization of the fashion industry and its effect on Ghanaian, independent fashion designers.

Biney-Aidoo et al (2013) also assessed apprenticeship system as a means of acquiring sewing skills in Ghana.

None of these works reported on the quality of work (in terms of garment designing and construction) that garment producers in the small scale industry produced. Neither did these works assess the knowledge base of garment producers on the elements that interacted with each other to produce a well fitting garment that can compete in the international market. This study therefore looked at the knowledge base of dressmakers on darts and how they applied their principles in garment designing and construction.

CHAPTER THREE

METHODOLOGY

The study was conducted to assess the knowledge base of dressmakers' in the Central Region on application of darts, in garment designing. This section of the research describes: the research design,

population and sampling techniques, the instruments for data collection and strategies, data analysis instrument and finally, validity methods that was employed for the research.

Research Design

The design that was used for the research was the descriptive design. Bordens and Abbott (1996) have described this design as a process of collecting data in order to test hypotheses or answer a question that concerns the current status of the subject of study. Bordens and Abbott stated that the descriptive design also helps the researcher to discover important but hidden patterns in the subject of study.

Leedy andOrmrod (2010) have categorized descriptive research design into observation studies, correlational research, developmental designs and survey research. Due to the nature of the research study, two of the descriptive designs were combined into a multiple design (survey and observation studies). This decision enabled me to gather data that addressed the different aspects of the research problem. The use of multiple design combines the strengths and avoids the weaknesses of single design and also helps to solicit answers that would answer research questions.

To justify the use of survey as one of my multiple designs, I wanted the participants to tell me about what they know with respect to dart principles (dart manipulation, added fullness and contouring). Responses to questions in this regard could only be collected through survey. Leedy andOrmrod (2010) have described survey as a research which involves the acquisition of information about one or more groups of people by asking questions and tabulating answers that respondents will give through interview. They asserted

that questions could be related to the groups' characteristics, opinions, attitudes, or previous experiences. The ultimate goal is to learn about a large population by surveying a sample which in this case, was to ascertain dressmakers' knowledge about patternmaking principles.

With respect to choosing observation studies as the other multiple design, I wanted the participants to demonstrate what they know about dart principles by constructing garments of different designs. According to Gay (1992), since all studies are designed to either test hypothesis or answer research questions, they all require data with which to do so. Data in this regard could only be collected through observation. Unlike qualitative studies where observations are usually recorded in great details to capture a wide variety of ways in which people or animals act, the observations that were made in this study was associated with quantitative research. Leedy and Ormrod (2010) described observation in quantitative research as a form of observation that tends to have a particular, pre-specified focus. In the case of this study, I wanted to observe the accuracy with which dressmakers' applied the dart principles in plotting and cutting out.

In view of these justifications, the multiple design (survey and observation studies) was used for the study. In spite of this multiple design having the strengths of both survey and observation studies, it was costly, laborious and a time consuming method.

Population

Polit and Hungler (1999) have defined population as the entire aggregation of cases that meet a designated set of criteria. The population for the research was dressmakers in the Central region of Ghana. However, the

accessible population was the dressmakers and tailors association. The association was set up to bring all dressmakers and tailors together as a co-operative group in order to have one voice in seeking better government policies concerning their industry, set standards in training, benefit from government and NGO funds, assist members financially, establish networks, and develop skills of members. Although there are a number of benefits associated with being a member of the association it is not every dressmaker that identifies him or herself with the association.

In an interview with the secretary of the dressmakers and tailors association for the central region, it was revealed that each district in the region had its own branch of the association. These branches have been subdivided into zones to give every dressmaker an opportunity to join the association, and also make the association vibrant and effective. The association which has a membership of about two thousand is comprised of:

1. Established dressmakers with formal vocational training: dressmakers and tailors who have been taught how to construct garment from scratch in a formal setting for a stipulated amount of time. These dressmakers upon completing their studies then set up their own apparel construction shop.
2. Established dressmakers with informal vocational training: dressmakers who have set up their own shop after learning in an apprentice role, under the tutelage of an established dressmaker for a stipulated amount of time.
3. The apprentice: dressmakers and tailors who are receiving training under the tutelage of an established dressmaker.

Sample and sampling procedure

The process of selecting a portion of the population to represent the entire population is what is referred to as sampling (Leedy&Ormrod, 2010; Polit&Hungler, 1999). For the purpose of the research to be achieved, 50 dressmakers were randomly selected through the multistage version of cluster sampling design. With respect to this study, three stages of cluster sampling were employed before final participants were selected.

Firstly, using the districts as clusters, 3 clusters were randomly selected through the lottery method from a compilation of the entire district in the Central region (Agona West Municipal District, Komenda/Edina/Eguafo/Abirem Municipal District, and Cape Coast Metropolitan District). According to Leedy&Ormrod (2010), when a predetermined random sample is selected, the researcher can assume that the characteristics of the sample approximate the characteristics of the total population. In this case, the dressmakers and tailors association in all the districts have similar characteristics in terms of composition and dressmaking ideologies. Ragin and Becker (1992) have also inferred that, in cases where population is homogenous with respect to the characteristics of interest, responses tend to be repetitive that there is no need to continue. Thus, selecting a predetermined number (1 to 20) will yield almost the same result. Based on these assertions, 3 clusters were randomly picked through the lottery method at this stage.

In each cluster (district), the association has been divided into zones in order to make the association effective and accessible to all dressmakers and tailors in the district. At this stage, zones were systematically selected from

each cluster. This was done by assigning numbers to zones in each district after which a coin (heads for odd numbered zones and tails for even numbered zones) was tossed to determine whether to pick odd numbered zones or even numbered zones. Zones in each district are illustrated in Table 1. At the end of this exercise, odd numbered zones were picked and they were 7 in number (Swedru, Nyakorom, Elmina, Komenda, Kawoano-Pado, Abura and kakumdo). This way of selecting zones was based on Leedy&Ormrod (2010) definition for systematic sampling which is selecting individuals or clusters according to a predetermined sequence which originates by chance.

Table 1:Zones in Selected Districts

District	No. Assigned	Zonal Name
Agona West District	1	Swedru
	2	Asafo
	3	Nyakrom
	4	Kwanyako
Komenda/ Edina/ Eguafo/Abirem Municipal District	1	Elmina
	2	Kissi
	3	Komenda
	4	Abirem

Cape Coast Metropolitan District		
	1	Kawoano-Pado
	2	Master Sam
	3	Abura
	4	Ola
	5	Kakumdo

Source: Researcher's field data, 2014

Finally, a sampling frame was constructed for each zone after which the lottery method was employed to sample 14% of the total membership of each zone (for the purpose of fair representation) as the focus was 50. This sample size was based on Adler & Adler (1998) assertion that graduate students should aim for a sample around 12 and 60 if interviews are supplemented with participant-observation. In an observation study by Kontos (1999) 40 preschool teachers were used. Similar observation studies like that of Forster & Ampong (2012) also used a small number of participants as well. These sample sizes (12 to 60) are used in studies that involve observation due to the fact that, observation involves meticulous attention to detail, a great deal of time and often, the help of more than one research assistants. Table 2 depicts the membership of sampled zones and their associated sizes that were sampled.

Table 2: Membership of selected zones and sampled size

Zonal Name	Membership	Sample	%
Swedru	801122		
Nyakrom	270306		
Elmina	600816		
Komenda	550816		
Kawoao-pado	681020		

Abura300408

Kakumdo450612

Total	365 50100
--------------	------------------

Source: Researchers field data, 2014

The sample was made up of established dressmakers who had received either formal or informal training in dressmaking. The study excluded apprentices due to the fact that they were being trained under the tutelage of these established dressmakers (madam or master). Thus, the knowledge base of the madam or master is what is transferred to the apprentice. Dressmakers who participated in this study comprised of 39 women and 11 men. These dressmakers were between the ages of 25 and 60 as indicated in Table 3 and had been working for varying number of years with the least having worked as established dressmakers for 4 years (Figure 23). Dressmakers who participated in this study were therefore considered as competent and experienced dressmakers. All this notwithstanding, participants had different educational background as shown in Figure 24. Nine representing 18% had not received any formal education but the remaining 41 (82%), had received formal education to different levels.

Table 3: Age Distribution of Dressmakers

Age	No.	%
25 30	11	22
31 40	22	44
41 50	11	22
51 60	08	12

Total	50	100
--------------	-----------	------------

Source: Researcher's field data, 2014

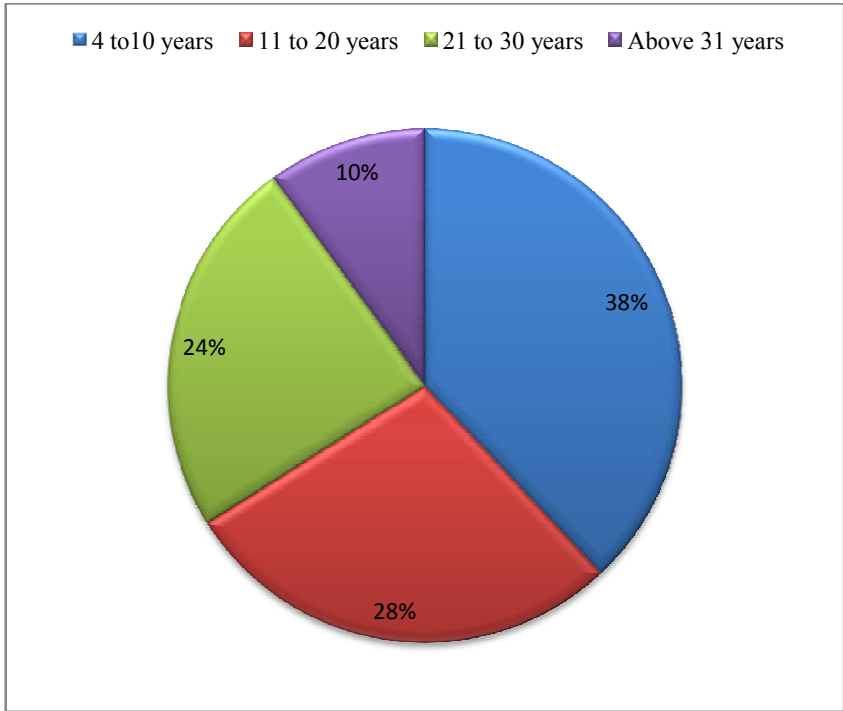


Figure 23: Number of working experience (source: Researcher's field data, 2014)

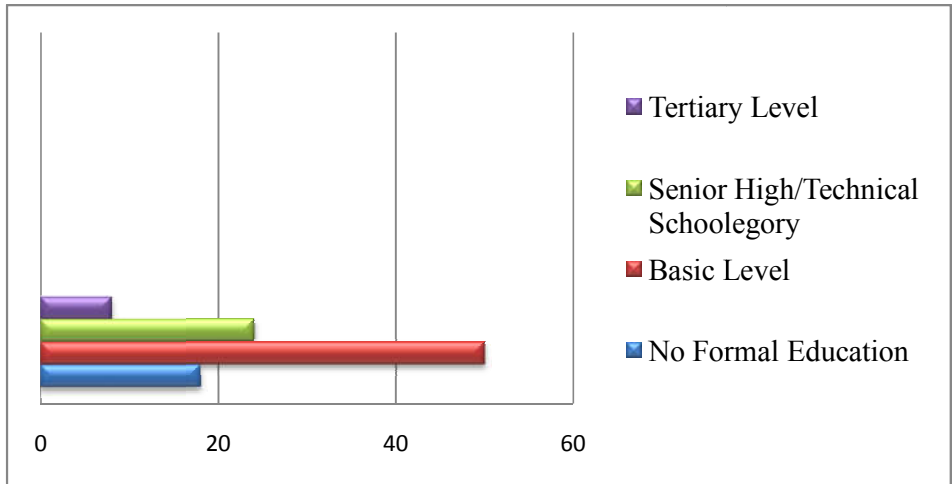


Figure 24: Level of education of dressmakers (Source: Researcher's field data, 2014)

According to Bortei-Doku “et al” (2011), different systems of TVET have evolved in Ghana and individuals who want to pursue this form of training can opt for any depending on their goals, aspirations, expenses involved, among many other factors. The form of education received for dressmaking by sampled dressmakers constituted 20 (40%) formally trained and 30 (60%) informally trained dressmakers. Table 4 shows the origin of skill acquisition for dressmaking.

Table 4: Origin of skill acquisition

Origin of skill acquisition	No.	%
Formal		
Senior High/Technical School	03	06
NVTI	07	14
Fashion School	07	14
Polytechnic	02	04
University	01	02
Informal		
Apprenticeship	30	60
Total	50	100

Source: Researcher’s field data, 2014

As indicated in Table 4, the composition of formally trained dressmakers were 7 (14%) NVTI graduates, 3 (6%) Senior Technical graduates, 2 (4%) Polytechnic graduates, 7(14%) Fashion school graduates and only one (2%) University graduate. Those who had been trained informally constituted 30 (60%) dressmakers who acquired the skills through apprenticeship training.

Instruments

With respect to this study, the instruments used in collecting relevant data were, semi-structured interview guide (Appendix A) and observation checklist (Appendix B).

Observation checklist, according to Leedy and Ormrod (2010), allows the researcher to simply check whether each item on the list is observed, present or true or is not observed, present or true. This research was based on the assumption that some garments constructed by some dressmakers lack professional look and do not fit well. In order to answer the research question and test hypotheses, methods, rules, and plots that governed the applications of dart principles for a well fitting garment were listed for observation. Each dressmaker was given three designs to demonstrate how the dart principles were applied in making each garment. Although this instrument assisted in providing information which participants were unable to provide verbally, the knowledge of being observed influenced participants' actions.

For the sake of clarification as well as the need to deduce the rationale behind certain answers and actions of participants, the semi-structured interview was used in addition to the observation checklist. Leedy and Ormrod (2010) have stated that Semi-structured interview creates room for a researcher to ask one or more individually tailored questions in addition to a set of standard questions. According to them, this allows the researcher to get clarification about answers or probe into the reasoning of respondents. In order to ascertain dressmakers' knowledge base about the application of dart principles, some standard questions were asked. Based on the research questions and hypotheses, the semi-structured interview was made up of three parts: (a) Questions that were related to participants' form of training, (b)

Questions that were related to dressmakers' knowledge base on patternmaking, and (c) Questions that were related to dressmakers' knowledge base on darts. Although this instrument helped to correct dressmakers' misunderstanding on some questions, the knowledge of being "interviewed" influenced participants' responses to some questions.

Limitation

The nature of the study required me to ask, observe, describe and document how dressmakers use patternmaking principles in constructing garments. The research design that was appropriate for the study was the descriptive research design which had the advantage of providing accurate description of the activities, associated with the research. However, the measuring instruments available for undertaking descriptive study which in this case were observation and interviewing, posed series of challenges. Among these challenges were:

1. The instruments offered less anonymity since the interviewer/observer (researcher) knew the identity, work place, and zones of each sampled dressmaker.
2. Some dressmakers were not willing to be recorded and videotaped.
3. The time frame for instruments administration were quite lengthy therefore, possibility of inconveniences were very high.

Due to the fact that some members of the dressmakers and tailors association in the Central region were observed and interviewed, generalization can only be limited to dressmakers and tailors association in the Central region.

To address the challenges that the instruments presented, the following steps were taken:

1. Dressmakers were offered assurance of complete anonymity by not indicating name of zone and shop location on instruments.
2. With those who were not willing to be recorded and videotaped, their responses, processes, and results were documented in details to ensure that results were not compromised.
3. To avoid any inconveniency, sampled dressmakers were contacted on phone to fix convenient date for data collection. During the pilot study, the minimum and maximum time recorded for data collection were 5 hours and 7 hours respectively. Based on this, a time frame of 7 hours was allocated to each dressmaker for data collection.
4. Dressmakers were motivated by making provision for fabrics, sewing notions and brown papers. They were also, allowed to pick their own models for the test designs.

To ensure that the instruments measured what they were actually intended to measure, the observation checklist and the semi-structured interview guide were given to supervisors and colleagues to check if items were relevant, clear and unambiguous, and then pre tested on 10 dressmakers in Ksoa. Aside this, the Cronbach alpha coefficient for this study was 0.754. According to George and Mallery (2003), Cronbach's alpha score of 0.7 is considered to be acceptable reliability since the closer Cronbach's alpha coefficient is to 1.0, the greater the internal consistency of the items in the scale.

Data Collection Procedure

Polit and Hungler (1999) have defined data as information obtained in a course of a study. To assess dressmakers' knowledge base and application of the dart principles in garment designing, a pilot study was conducted on 4 dressmakers in Konongo prior to this study. In the pilot study, dressmakers were observed as they manipulated, plotted and cut out test designs that featured the application of dart principles (dart manipulation, added fullness and contouring). Result from the pilot study indicated that dressmakers were very skilled in cutting out. However, the participants could not apply the dart principles properly which resulted in the inability for sewn garments to fit clients properly. Also a minimum of 5 hours and a maximum of 7 hours were the time frame for data collection during the pilot study.

With this present study, the multistage cluster sampling procedure was used to select 50 dressmakers from the Central region of Ghana. Data was collected through observation checklist and semi-structured interview schedule. In order to avoid any inconveniency, contacts were made with dressmakers on the phone to seek their consent to participate, fix dates for personal meeting and data collection. Each dressmaker was asked to choose a female client as his or her model for all the test designs. Brown paper and fabric were provided for dressmakers to demonstrate how they would apply the dart principles to make the test designs (A-shape princess dress, gathered yoke skirt and a strapless bodice). The demonstration of measuring procedure for each test design, plotting of design with measurement, cutting process and sewing were observed and recorded.

The observation checklist that was used to collect data that was related to measurement included: (a) Tools and materials for measuring, (b)

Measurement taken for each design, (c) How measurement was taken, and (d) The amount of fabric needed. The observation checklist that was used to collect data on the application of dart principles (plotting of design details) included: (a) tools and materials for plotting, (b) method used to transfer measurement for design, (c) location of dart points, curves, lines and notches, (d) manipulation and treatment of dart, (e) determination of fullness needed where applicable, (f) perfection of lines and curves, (g) input of allowances and (h) total time spent on plotting, cutting and sewing. The sewn garments were worn by each participant's model for assessment based on (a) design analyses, (b) manipulation of dart, (c) cutting out, (d) sewing of test designs, (e) achieve replica of test designs and (f) fit of test design on clients. The following guidelines were developed to aid data collection on plotting of test designs

With respect to design 1 (A-shape princess/paneled dress) that was generated through the application of dart manipulation, dressmakers were to:

1. Use the required measurement to plot the outline of the dress as depicted by the design (A-shape).
2. Plot the styline by extending the upper end of the waist fitting dart to mid-shoulder and the lower end of the waist fitting dart to the hemline.
3. The styleline that joins the upper end of the waist dart to the mid-shoulder should be slightly curved at the bust point not straight. This will allow for enough room to accommodate fullness at the bust area.
4. Raise hemline at side seam by 2.5cm.
5. Crossmark for notches and separate the pattern into two pieces.
6. Remove dart intake

7. With respect to the side panel piece, trim off 1cm from the styline that joins the bust point to the mid-shoulder
8. Label, true, and blend pattern pieces for perfect/well shaped panels.

For the back of design, participants were to:

1. Use the required measurement to plot the outline of the dress as depicted by the design (A-shape).
2. Plot the styline by extending the upper end of the waist fitting dart to mid-armhole and the lower end of the waist fitting dart to the hemline.
3. Ensure that the styleline that joins the upper end of the waist dart to the mid-armhole is slightly curved not straight.
4. Raise hemline at side seam by 2.5cm.
5. Crossmark for notches and separate the pattern into two pieces.
6. Remove dart intake
7. Remove dart excess at the shoulder by plotting shoulder dart length and width along the styline that joins the bust point to mid-armhole and trim off excess.
8. Label, true, and blend pattern pieces for perfect/well shaped panels.

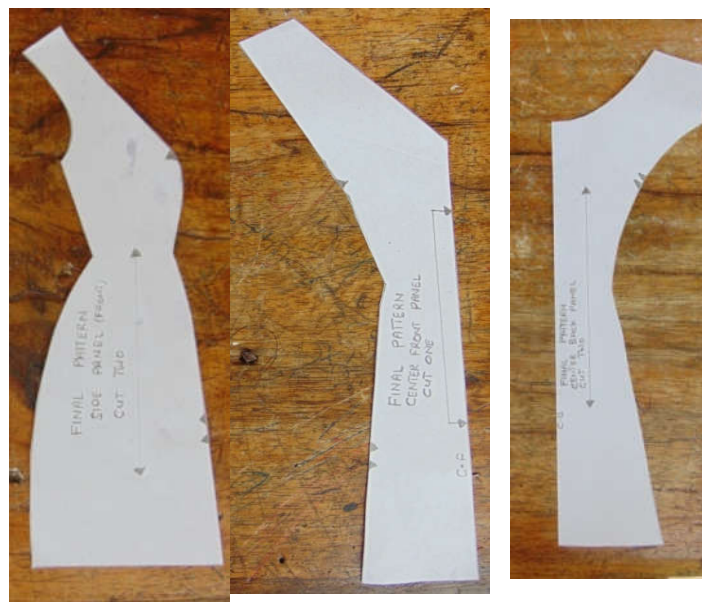




Figure 25: Final patterns for dress design (Source: Author's construct)

Design 2 which was generated from added fullness featured a gathered skirt with a yoke; the yoke is about $3\frac{1}{2}$ inches down from waistline and it is attached to an equally gathered skirt. Dressmakers were expected to:

1. Use required measurement to plot the skirt yoke ($3\frac{1}{2}$ inches long).
2. Remove dart intake by reducing the waist line by the width of dart intake (5cm/2inches).
3. Raise waistline and seamline of yoke by 1.5cm at the side seam.
4. Join raised waistline and seamline to center front (front yoke) and center back (back yoke) with a slight curve not a straight line. Add zip extension to center back.
5. Label, true and blend to complete yoke pattern.

With respect to the section of the skirt to be gathered, cut pattern depending on the amount of fullness preferred (half, twice, or thrice the waist measurement).





Figure 26: Final patterns for skirt design (Source: Author's construct)

With respect to design 3 which was created by using contouring, it featured a princess bodice foundation that is contoured above, below and in between the bust. Dressmakers were therefore expected to:

1. Use the required measurement to plot the outline of either the dress block or the bodice block and use it as a starting point.
2. Plot the strapless styline of the bustier as required by the design.
3. Extend waist dart legs to styline.
4. Curve the dart legs outward so that dart will be stitched conversely not straight.
5. Separate pattern pieces by using the dart legs as guide. This will automatically remove the waist dart intake and ease at the styline.
6. Reduce the side seam by 2cm.
7. Reduce center front line by 2cm.
8. Redraw the styline with a slight curve as depicted by the design
9. Shape under bust to fit

With respect to the back of test design,

1. Draw in back shape of bustier

2. Remove ease on styline by taking in $\frac{1}{4}$ inch on each side of the dart leg.
3. Remove ease at the bust area by taking in $\frac{1}{2}$ inch at the side seam.
4. True and blend pattern pieces for perfect fit.

Final pattern pieces for test design 3 are shown in Figure 27.

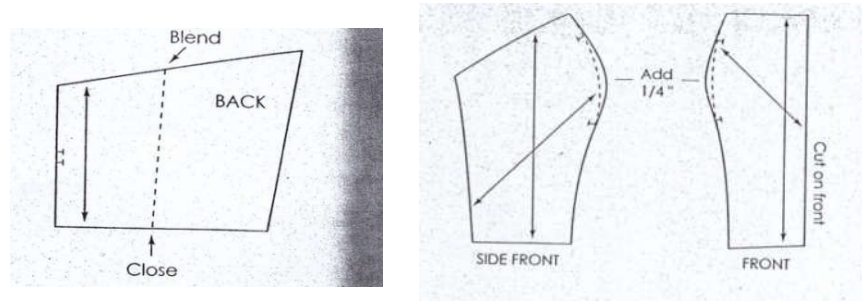


Figure 27: Final pattern pieces for bustier (source: Joseph-Armstrong, 2010)

The participants were then interviewed to assess their form of training, knowledge base on darts and how they applied the dart principles in garment designing. In all, data was collected over a period of two and a half months (August, 2014 to mid October, 2014). A minimum of 5 days and a maximum of 10 days were spent in each zone. A day's visit for data collection lasted for 5 hours (shortest) to 7 hours (longest).

Data Analysis

In order to make sure the collected data was accurate, complete, consistent and usable; the raw data was edited, coded and tabulated for analysis. During the editing process, the raw data was screened to identify responses that were incomplete and filled in abbreviation. With the help of the shorthand book (abbreviations and its corresponding full word) that was

created for the study and recorded interactions with participants, all abbreviations and incomplete responses were expanded and completed. A codebook was then created for all responses to facilitate data entry for statistical analysis. This was done by tabulating question numbers with their corresponding responses and numbers assigned to each response. Responses to open ended questions were scanned and grouped under major groups before they were entered in the codebook.

Research Question 1 to 4, employed the use of frequencies and percentages to analyze dressmakers' responses. Pictorial presentations of trends and proportions derived from the statistics were also used.

With respect to the hypotheses 1, 2 and 3 that were formulated, independent sample t- test was used to analyze each hypothesis. This statistical tool helped to determine if there was a statistically significant difference among dressmakers with different form of education in terms of their application of the dart principles.

Ethical Consideration

The researcher sought permission from the central region secretariat of Ghana National Tailors and Dressmakers Association to conduct the research. Meetings were then held with members from sampled zones to explain the purpose of the research as well as to assure dressmakers that the study was strictly for academic purposes and that utmost confidentiality would be observed.

CHAPTER FOUR
RESULTS AND DISCUSSION

The purpose of this research was to assess the knowledge base of dressmakers' on darts and how they applied the dart principles in garment designing in the central region. In this chapter, the data gathered from the study are analysed and discussed. Responses on participants' form of education received for dressmaking, knowledge base on patterns, knowledge base on darts and how patternmaking principles are applied in cutting out were analysed with the Statistical Package and Service Solution (SPSS) for windows version 17. Descriptive statistics (Frequencies and percentages) were used to report participants' responses for the research questions. Independent sample *t*-test was used in testing the hypotheses.

This chapter is presented under the following headings;

1. Knowledge base of dressmakers on patternmaking
2. Knowledge base of dressmakers on darts
3. Application of dart principles in cutting out
4. Differences between formally and informally trained dressmakers with the application of dart principles (dart manipulation, added fullness, and contouring) in garment designing.
5. Summary

Knowledge base of dressmakers on patternmaking

Dressmakers who participated in this study comprised of 39 women and 11 men who were between the ages of 25 and 60. These participants had been working as established dressmakers for varying number of years ranging from 4 to over 31 years. Patternmaking plays a very major role in garment

designing and production since it is a means through which change in the outline of clothes or the shape around the block can be changed while the body/block remains constant. As reviewed in the literature on patternmaking, patternmaking can at first seem difficult and intimidating. But, with a basic understanding of the rules to be followed and broken, the dressmaker will soon learn interesting, challenging and creative approaches to patternmaking (Fischer, 2009).

To draw or plot the right styleline in the correct position on a garment, it takes experience and practice. Dressmakers' responses to how patterns for garments can be developed were centered on freehand cutting, drafting and draping or reverse engineer. Figure 28 captures the methods employed by dressmakers in making patterns.

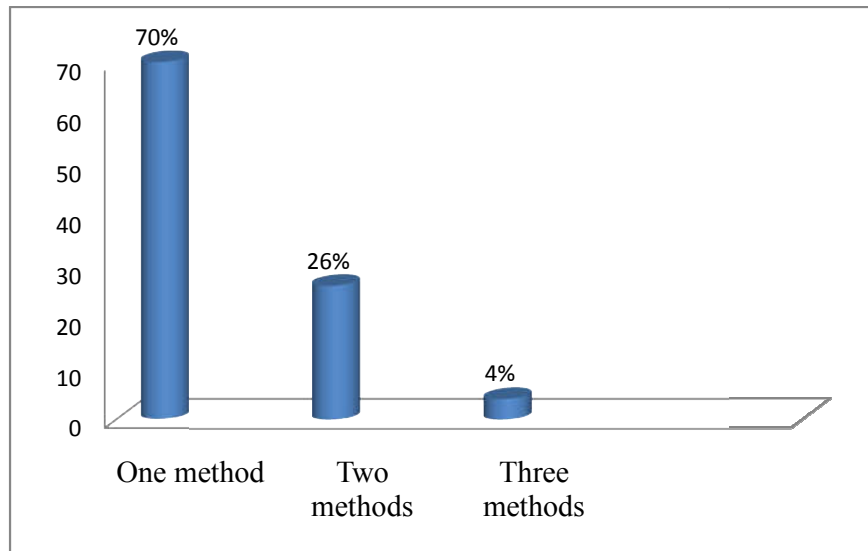


Figure 28: Methods used for making patterns (Source: Researcher’s field data, 2014)

Interestingly, majority of the dressmakers (70%) stated only freehand cutting (one method) as a means of developing patterns. A review on this category of dressmakers’ educational background indicated that some did not receive any formal education whereas those who did, got to the basic level. Twenty six percent(26%) stated freehand cutting and drafting (two methods); 4% which constituted minority of the respondents stated freehand cutting, drafting and draping or reverse engineer (three methods) as a means of achieving a shape around the body. A look at the educational background for the respondents’ for these two categories showed that, they were mostly SHS/technical, polytechnic and university graduates indicating that, dressmaking skills were acquired formally.

Among these two category of dressmakers (two methods (26%), three methods (4%)), all stated drafting as a means of generating patterns for garment designing. From this proportion, only 24% said they can draft the

basic block set. Table 5 indicates the measurement format this set of dressmakers employed for drafting the basic block set. Surprisingly, most of the dressmakers who stated only one method as a means of generating patterns did not know what the basic block pattern was and this can be attributed to the form of training they received for skill acquisition; thus apprenticeship training which literally does not constitute theoretical framework.

Table 5: Measurement format used by respondents for drafting the basic block set

Measurement for drafting	No.	%
Convenient measurement	03	25
Standard measurement	01	17
Client body measurement	08	58
Total	12	100

Source: Researcher's field data, 2014

From Table 5 majority (58%) said they made use of client's body measurement to draft the Basic block set. According to them, this is done for clients who are willing to pay extra cost as it is time consuming. Twenty five percent (25%) said they made use of convenient measurements on the market as it could easily be altered to fit a wide range of clients. The minority group which constituted 17% said standard measurement was employed, when drafting the basic block set. However, the reason for the use of standard measurement was the same for the use of convenient measurement. Thus, the use of the standard mea

With respect to the concept of figure analyses in patternmaking, all the dressmakers said that they analyzed their clients figure before making patterns

for them, however, response to what figure analyses entailed differed. Sixty-six percent (66%) said figure analyses involved looking at the client to see if she has any deformity and the remaining 34% said that it involved using client body measurement to determine her shape. The fact that majority got the concept of figure analyses wrong points directly to the form of education majority of the respondents received which basically, does not have any theoretical base (informal training). The set of dressmakers will consequently construct garment without necessarily having an understanding of the figure he or she is working with. This revelation confirms Fischer (2009); Joseph-Armstrong, (2010) declaration that, some garment producers create recipe for disaster in garment designing by taking certain elements such as figure analyses for granted.

With respect to cutting out during patternmaking, Figure 29 depicts the cutting methods employed by dressmakers at their workshop.

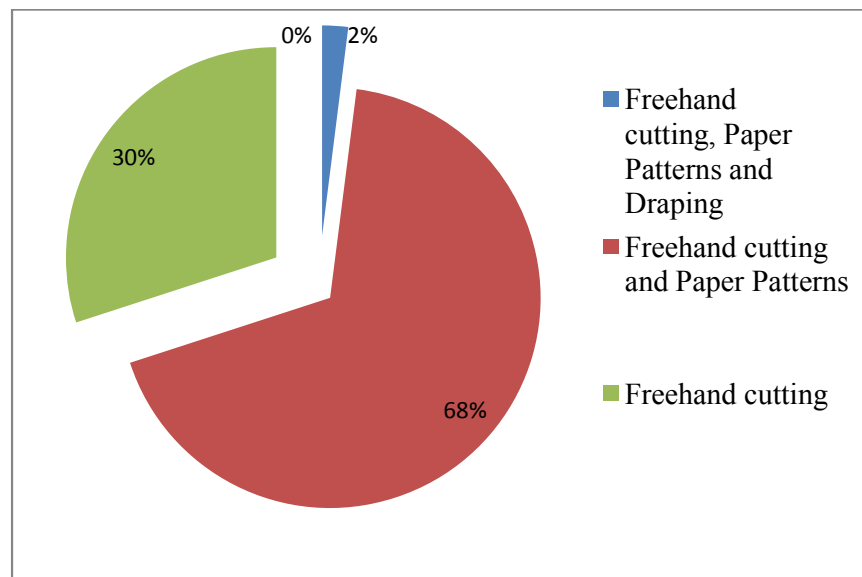


Figure 29: Cutting out methods employed by respondent at their workshop (Source: Researcher's field data, 2014)

From Figure 29, majority of the respondents (68%) employed both freehand cutting and paper patterns to produce garments at their workshop; 30% employed only freehand cutting whereas only 2% made use of freehand cutting, paper patterns and draping at their workshop to produce garments. It is clear that all the participants made use of freehand cutting in producing garments. This supports Forster's (2009) assertion that, Ghanaian dressmaker's chiefly use freehand cutting in producing garments. Dressmakers explained that, the freehand cutting method enabled them to produce garments faster and in effect, enhance their financial status. They also said that the freehand cutting method was cost effective. The category of participants who in addition to freehand cutting used paper patterns and or draping explained that they made use of the other technique (s) to produce complicated designs for clients who are willing to pay extra charges, teach apprentices the concept of freehand cutting and at times, at the request of their clients.

Knowledge base of dressmakers on darts

As reviewed in the literature, darts is a necessary feature of a well-fitting garment since they allow a two-dimensional piece of fabric to fit smoothly over three-dimensional bodies. In terms of definition, purpose and reasons associated with the construction of darts, Figure 30 captures dressmakers' responses.

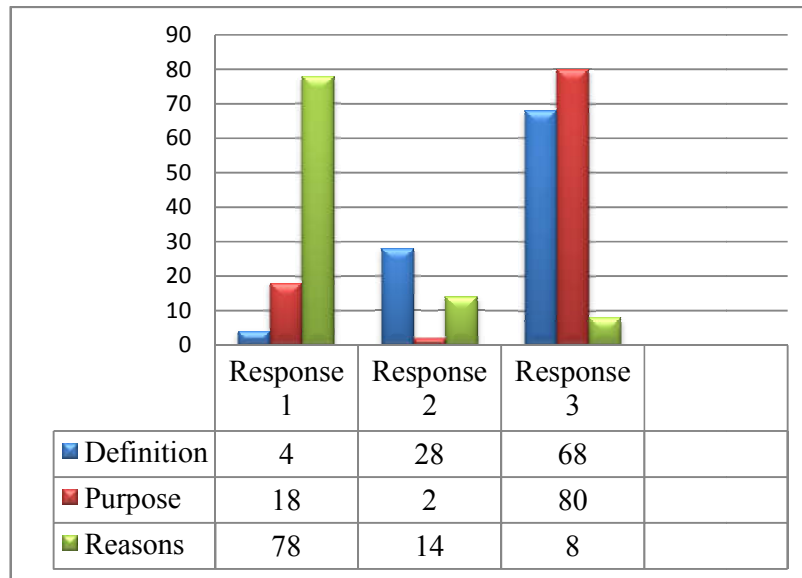


Figure 30: Knowledge base of dressmakers on dart (Source: Researcher’s field data, 2014)

In terms of definition, dressmakers exhibited great knowledge base on it despite the varying responses. Four percent (4%) were of the view that darts form part of a style (response 1), 28% also stated that darts were triangular or diamond shape in garments that are stitched to make garments fit well (response 2) and majority of the participants (68%) were of the view that darts give shape to garments (response 3). The fact that all dressmakers were able to give correct definition of dart shows that indeed, darts are recognized as necessary or basic feature of a well fitting garment.

With respect to the purpose of darts in garments, 18% said darts make a garment to fit well (response 1), 2% were of the view that darts give body to garments (response 2), and 80% said darts give shape to a garment (response 3). Apart from response 2 (darts give body to garments) which interestingly constituted the least response, response 1(darts make a garment to fit well) and response 3 (dart gives shape to a garment) were correct response to the

question that was asked. This is because both responses are imbedded in the purpose of dart as stated by authors like Baker, 2007; Fischer, 2009; and Jeffreys, 2006. According to these authors, the purpose of a dart is to allow a two-dimensional piece of fabric fit smoothly over a three-dimensional body by creating room to accommodate fullness. In other words, the purpose of dart is to make a garment fit well by creating room to accommodate fullness which automatically gives shape to the garment.

With respect to the marking of darts, knowledge about dart size, length and shape are tools that dressmakers cannot do without. These three elements are what will define a dart as “well made” or “poorly made” as reviewed in the literature. With regards to dart size, length and shape, all participants agreed to the fact that dart size, length and shape had an influence on the fit of a garment in that, it can make a garment either fit well or not. Hence, should not be constructed the same way for all clients. However, responses as to why dart size, length and shape had an effect on the fit of a garment hence should not be constructed the same way for all clients varied. From Figure 30, Seventy-eight percent (78%) reasoned that because body shape differ (response 1), dart size, length and shape must also be marked based on the body shape one is working with. Fourteen percent (14%) also reasoned that because styles differ (response 2), each style will require a particular way of marking out its darts. However, when this category of dressmakers were asked if they will mark out darts of a particular style the same way at the request of two individuals with different body shape, their response was ‘yes’. This indicated that dressmakers in this category did not really know how dart size, length and shape influenced the fit of a garment. The remaining 8% were of the

view that, dart size, length and shape should not be constructed the same way for all clients since it can distort the style and shape of the garment (response 3). Apart from response 1 (body shape differ) which supports Hollen and Kundel (1992) assertion that it is the body shape that determines dart size, length and shape; response 2 (style differ) and response 3 (distort style and shape of garment) although true to some extent, does not necessarily account for why darts size, length and shape should not be constructed the same way for all clients.

To bring out the effect that a dart is supposed to achieve, pressing plays an important role as well. The direction to which a dart is pressed has a significant impact on the fit of a garment as asserted by Baker, (2007). In view of this, dressmakers were asked to determine the direction to which a vertical dart and a horizontal dart will be pressed. Table 6 depicts the responses that were given.

Table 6: Direction for pressing a dart in a garment

Direction for pressing darts	No.	%
Vertical darts towards side seam and Horizontal darts pressed down	26	52
Vertical darts towards center front and Horizontal darts pressed up	05	10
Vertical darts towards side seam and Horizontal darts pressed up	03	06
Vertical darts towards center front and Horizontal darts pressed down	16	32
Total	50	100

Source: Researchers field data, 2014

Majority of the respondents (52%) were of the view that, vertical darts should be pressed towards the side seam and horizontal darts, pressed down; 32% were also of the view that, vertical darts should be pressed towards the center and horizontal darts, pressed down; 10% said that vertical darts should be pressed towards the center and horizontal darts, pressed up; 6% were of the view that vertical darts should be pressed towards the side seam and horizontal darts, pressed up. It was however observed that, vertical darts when pressed towards the center front or back produced good effect than when pressed towards the side seams and horizontal darts when pressed down produced good effect than when pressed up.

Fischer, (2009);Hollen and Kundel, (1992); Joseph-Armstrong, (2010) clearly state that darts can be relocated, released, turned into pleats, gathers or style lines. These techniques do not only create fit, shape and volume, they also change the style and design of the garment. Dressmakers were asked to analyse the test designs to determine how darts have been used in each design. Table 7summarisesdressmakers' responses on how darts have been used.

Table 7:Identification of dart use in test designs

Number of test designs analysed	No.	%
All 3 test designs (A-shape princess styleline dress, Gathered skirt with a yoke, and a princess bustier)	07	14
1 test design (A-shape princess styleline dress)	37	74
None	06	12
Total	50	100

Source: Researcher's field data, 2014

With respect to designing with darts, 14% of the dressmakers were able to identify how darts have been used decoratively in all the three designs.

Dressmakers in this category were able to tell that, the A-shape princess styleline dress was achieved by transferring the underarm dart to the mid-shoulder which was then joined to an extended waist dart. With the gathered skirt with yoke, they said the design was achieved by closing the waist darts to give a close fitting yoke, which was then attached to an equally spread out lower section. The dart use in the princess bustier was described the same way as the princess styleline in the A-shape dress however, they stressed that ease and dart intake ought to be taken out in order to achieve the hugging effect that a bustier is supposed to create. Seventy four percent (74%) which constituted majority of the dressmakers were able to identify how darts were used in only the A- shape princess styleline dress; and 12% of the dressmakers were not able to tell how darts were used decoratively in the three designs. This category of dressmakers simply said the garments did not have darts in them.

Application of dart principles in cutting out

The means through which pieces of a given style is acquired is through cutting out. This procedure in garment construction requires the use of accurate body measurements as dictated by the style, aids for shaping and most importantly, alertness.

Tools and materials used by dressmakers

The main tools used by the dressmakers during the cutting out process were their measurement note books, pens, large flat cutting table, scissors, tailor's chalk, tape measure, yard stick, curves, pins, pressing iron and the fabric to be cut. It was however observed that, majority of the participants hardly made use of the curves in shaping the various designs on the fabric and

this could be attributed to the use of freehand cutting method which was chiefly employed by most of the participants. Also, participants hardly ironed pattern pieces as they were cut out. When asked why they did not iron the pieces as they cut them out, the main response was that it will only be a waste of time.

Measurements and allowances used by dressmakers to cut out designs

Generally, measurements used by the dressmakers to cut the dress were: across back, waist to hip, bust, waist, hip, shoulder to waist, required dress length, skirt length and bodice length of the client. These measurements were taken very closely to the body but over the client's clothes, irrespective of the weight of fabric and style. However, some dressmakers kept asking their 'clients' whether they were comfortable with the measurements being taken before recording them. Inputs of allowances were between 1 to 2 centimeters for shoulder, armhole and yokeline, and 2 to 2.5 centimeters for hem turning.

Dressmakers' application of the dart principles in cutting out are captured in Table 8 where dressmakers were assessed with the following qualities: Not Well (N.W), Not Very Well (N.V.W), Neutral (N), Well (W), and Very Well (V.W). Dressmakers in the category of "Not Well" were those who were not able to analyse test design, plot according to the dart principle involved and also failed to observe associated basic rules of the dart principle. Dressmakers in the category of "Not Very Well" were those who were able to analyse the test design but were not able to plot according to dart principle and its associated basic rules. The category of "Neutral" dressmakers included those who were not able to analyse the test design but were able to plot according to dart principle to an extent. Due to this category's inability to

analyse the test design, associated basic rules were also not observed. Dressmakers, who fell within the category of “Well” were able to analyse test design, plot according to dart principle but failed to observe some basic rules which although important, did not have any significant impact on the outcome of the test design. Dressmakers in the category of “Very Well” were those who were able to analyse test design, plot according to dart principle and observe all associated basic rules of the dart principle.

Table 8: Dressmakers’ application of the dart principles in cutting out

Assessment	No.	N.W	N.V.W	N	W	V.W	Total
		%	%	%	%	%	%
Design 1	50	0	20	26	36	18	100
Design 2	50	14	0	22	22	42	100
Design 3	50	0	38	26	20	16	100

Source: Researcher’s field data, 2014

As it has already been established, all the 50 dressmakers (100%) employed the use of freehand cutting in making garments out of which 70% made use of either one or both paper patterns and draping in addition to freehand cutting. From our literature that was reviewed, Foster and Ampong (2012) asserted that there are no laid down rules for the use of freehand method as opposed to developing paper pattern. However, there are certain basic rules that cannot be ignored when cutting out any given style. With respect to design 1, it is a basic rule irrespective of the cutting method to

- a. trim off dart excess after darts have been transferred,
- b. crossmark for notches
- c. remove dart intake
- d. label, true and blend pattern pieces to complete panels.

In light of this, only 18% of the dressmakers were able to plot and cut the test design according to the dart principle and associated basic rules involved. Thirty six percent (36%) were able to plot the test design well but this category of dressmakers ignored crossmaking for notches which is very important for such a style. Refusing or ignoring to crossmark for notches can result in mismatching of pattern pieces, uneven hemline and misplacement of panel seamlines if extra care is not taken.

Thirteen dressmakers representing 26% were able to plot and cut out the test design however, they misplaced the panel seamlines. With this category of dressmakers, 9 representing 18% choose to make the front panel lines run from mid- armhole instead of mid-shoulder through dart point to hemline. The remaining 4 (8%) also choose to make the panel seamlines of both the front and back of test design to run from mid-shoulder through dart point to hemline. This was due to their inability to analyse the test design to identify or indicate new location of dart points (panel seamlines). The effect of this action is that, specific style that is preferred by a customer will not be produced even though it will feature the element of interest based on the dressmakers inability to analyse the preferred design. Apart from the misplacement of panel seamlines, they also did not trim off excesses after transferring the darts which will create fitting problem if garment was to be sewn. Twenty percent (20%) of the participants who did not perform very well failed to remove dart intake after separating pattern pieces as well as the trueing of seamlines and hemlines. The effect of this action is that, the garment if sewn will have excess and uneven allowance at the side seams as indicated in Appendix D(viii). Again, the garment will not accentuate the body curves of its wearer

especially at the waist line. Apart from this effect, the princess line will also not pass through the bust point which will produce a very ill fitting garment.

With design 2, majority of the dressmakers (42%) were able to plot and cut the test design according to the dart principle and associated basic rules involved which if sewn, will produce the desired effect as indicated in Appendix D(iii). Twenty two percent (22%) were able to plot and cut the test design but the yokeline was almost straight instead of a perfect curve. This indicated that this section of respondent lacked understanding of how the waist dart have been treated; thus the waist darts have been closed which automatically creates a natural curve which only needs to be blended for a perfect curve. Another 22% of the respondents, indicating the presence of waist darts while plotting the test design. This clearly showed that dressmakers in this category were unable to analyse the design to determine how darts have been used to create such a design.

Minority of the respondents (14%) however were not able to plot and cut out the test design according to the dart principle involved. This section of respondents plotted between 6 - 8 inches below the waistline as indicated in Appendix D(iv), the effect of this action is that, when sewn, the yoke line will tend to flatten the buttocks of its wearer and also cause difficulty in wearing and removal, as indicated in Appendix D(v). Again, the wearer of such an article will feel restricted in many ways when walking, bending, reaching or sitting because, the yokeline is not well positioned.

With regards to design 3, 19 representing 38% of the dressmakers were not able to plot and cut out the test design according to the dart principle involved. Even though a section of this group made use of sample paper

pattern, they had problem with adjusting the paper pattern to suit the size they were working with. This could be attributed to (a) the lack of knowledge required to either reduce or increase the paper pattern to fit a particular size, or (b) the uniqueness of the size they were to work with. Thirteen dressmakers (26%) also had problem with locating the dart point although nipple-nipple and shoulder-nipple measurements were taken. Again, because the test design is close fitting, dressmakers who choose to plot and cut directly on fabric needed to take out the ease amount at the bust area as well as the dart intake however this category of dressmakers (26%) did not do so. The effect of this action is that, such an article will not qualify as close fitting which also places the comfort of its wearer at risk. To remedy this effect, a dressmaker will then sew in “mock darts” or tucksto make the styleline fit well on its wearer.

Twenty percent (20%) of the participants on the other hand were able to plot and cut the test design according to the dart principle however, this category of dressmakers ignored crossmaking for notches. On the other hand, 16% of the participants were able to plot, cut and sew the test design as dictated by the use of this dart principle (contouring). This section took into consideration that the test design when sewn should be close fitting as indicated in Appendix Dvi hence, all necessary excesses that needed to be taken out were treated accordingly.

Differences between formally and informally trained dressmakers with the application of the dart principles in garment designing.

To test the differences between formally trained dressmakers and informally trained dressmakers, independent *t*-test was employed to test the

hypotheses that were formulated. With regards to this, dressmakers for this section were first of all assessed on all the elements that come to play with the application of the dart principles thus; Design Analysis (D.A), Dart Treatment (D.T), Cutting Out (C.O), Sewing of Test Design (S.T.D), Achieving a Replica of Test Design (A.R.T.D) and Fit of Test Design (F.T.D). Raw scores were determined by allocating 5 points to each element based on procedures and associated basic rules that govern the execution of each element (Appendix B). The number of procedures and associated basic rules that were observed in each element constituted the raw scores for each dressmaker. Frequencies of raw scores are presented in Table 9

Table 9: Assessment of formally and informally trained dressmakers with the application of dart manipulation principle in garment designing

Assessment of test design 1	1 No	2 No	3 No	4 No	5 No	Total No	Mean Score
Formally Trained							
D.A	0	1	1	1	0	3	3.00
D.T	0	0	1	0	2	3	4.33
C.O	0	0	0	0	3	3	5.00
S.T.D	0	0	0	0	3	3	5.00
A.R.T.D	0	0	0	1	2	3	4.66
F.T.D	0	1	0	0	2	3	4.00
Informally Trained							
D.A	1	3	0	0	0	4	1.75
D.T	0	1	1	2	0	4	3.25
C.O	0	0	3	1	0	4	3.25
S.T.D	0	1	1	2	0	4	3.25
A.R.T.D	0	1	0	2	1	4	3.75
F.T.D	1	0	1	2	0	4	3.00

Source: Researcher's field data, 2014

With respect to the application of dart manipulation (Design 1) in garment designing, frequencies of scores and corresponding mean scores from Table 9 indicates that, the general performance of formally trained dressmakers in the design analysis (M=3.00), dart treatment (M=4.33), cutting out

(M=5.00), sewing (M=5.00), achieving a replica (M=4.66) and fit of test design (M=4.00) were better than that of informally trained dressmakers as lesser mean score for design analysis (M=1.75), dart treatment (M=3.25), cutting out (M=3.25), sewing (M=3.25), achieving a replica (M=3.75), and fit of test design (M=3.00) were recorded. These differences in scores could be attributed to formally trained dressmakers ability to indicate basic darts involved in the creation of design 1. According to Fischer (2009), identification of darts involved in the creation of a design gives the garment producer an idea as to how to treat or manipulate the dart to achieve a replica of the design. Observation of formally trained dressmakers with the application of dart manipulation principle showed that, the assertion made by Fischer, (2009) was true as their ability to analyse test design 1, greatly influenced the end product. It was also observed that design 1 garment fitted well on formally trained dressmakers' models than that of informally trained dressmakers' models. This can also be attributed to the fact that formally trained dressmakers had knowledge about how the basic darts involved should be treated to achieve the desired effect. However, the statistical outcome that determined whether a statistically significant difference existed between the two groups is presented in Table 10.

Table 10: Means, Standard Deviations, T-values and P-values for the application of dart manipulation in garment designing by two groups of dressmakers

Form of training	N	M	SD	df	t – value	p value
------------------	---	---	----	----	-----------	---------

Formally	3	26.00	3.86	5	-2.864	.035
Informal	4	18.22	3.00			

****significant $p < 0.05$, $M = \text{Mean}$, $SD = \text{Standard Deviation}$**

Source: Researcher's field data

The result from Table 10 indicates that when it comes to designing with dart manipulation principle, there is a statistically significant difference between formally trained dressmakers and informally trained dressmakers. Thus, the performance of dressmakers who have been formally trained in dressmaking ($M=26.00$, $S.D=3.86$) is better than the performance of dressmakers who received informal training in dressmaking ($M=18.25$, $S.D=3.00$; $t(5)=-2.864$, $p=.035$). Therefore, the null hypothesis which stated that there is no significant difference between formally trained and informally trained dressmakers with the use of dart manipulation in garment designing was rejected. As indicated in Table 9 and also Appendix E(i), formally trained dressmakers performance in the areas of interest were better than the informally trained dressmakers especially, when it comes to design analysis, dart manipulation, and achieving a replica of test design.

Table 11: Assessment of formally and informally trained dressmakers with the application of added fullness principle in garment designing

Assessment of test design 2	1	2	3	4	5	Total	Mean
	No	No	No	No	No	No	Score

Formally Trained							
D.A	0	1	0	2	0	3	3.33
D.T	0	0	0	2	1	3	4.33
C.O	0	0	0	0	3	3	5.00
S.T.D	0	0	1	0	2	3	4.33
A.R.T.D	0	0	1	1	1	3	4.00
F.T.D	1	0	0	0	2	3	3.66
Informally Trained							
D.A	3	0	1	0	0	4	1.50
D.T	1	1	2	0	0	4	2.55
C.O	0	1	1	2	0	4	3.25
S.T.D	0	0	3	1	0	4	3.25
A.R.T.D	0	1	1	2	0	4	3.25
F.T.D	2	0	0	2	0	4	2.57

Source: Researcher's field data, 2014

The application of added fullness principle in garment designing (Design 2) basically requires the garment producer to depict an increase fullness that is greater than the dart excess, then, add within and/or outside the pattern's frame where the fullness is needed (Aldrich, 1994; Hollen&Kundel, 1992; Joseph-Armstrong, 2010). From Table 11, mean scores of formally trained dressmakers in design analysis (M=3.33), dart manipulation (M=4.33), cutting out (M=5.00), sewing (M=4.33), achieving a replica (M=4.00), fit of test design (M=3.66); and that of informally trained dressmakers in design analysis (M=1.50), dart manipulation (M=2.25), cutting out (M=3.25), sewing (M=3.25), achieving a replica (M=3.25), and fit of test design (M=2.57) indicates that a difference exist between the two groups. A close look at the mean score of both groups with reference to cutting out of test design 2 shows that, formally trained dressmakers were able to cut out the test

design flawlessly whereas the informally trained dressmakers faced some difficulties with this aspect. Among the difficulties that were observed included their inability to transfer required measurements onto the fabric as dictated by the design and also, their inability to acknowledge the need for blending and trueing for perfect curves and lines. Interestingly, it was observed that the fit of design 2 fitted well on models of both groups of dressmakers'. To find out if statistically, a significant difference exists between the two groups with the application of added fullness principle, Table 12 depicts the statistical outcome of the test.

Table 12: Means, Standard Deviations, T-values and P-values for the application of added fullness in garment designing by two groups of dressmakers

Form of training	N	M	SD	df	t – value	p value
Formal	3	24.67	1.53	5	-2.253	.063
Informal	4	16.25	5.50			

****Significant $p < 0.05$, M=Mean, SD=Standard Deviation**

Source: Researcher's field data

As indicated in Table 12, the results are consistent with null hypothesis 2 which stated that there is no significant difference between formally trained dressmakers and informally trained dressmakers with the application of added fullness principle in garment designing thus, $p = (.063)$. Therefore, we fail to reject hypothesis 2. However, the mean statistics shows that, between the two groups, formally trained dressmakers had a higher mean ($M = 24.67$) than that of informally trained dressmakers ($M = 16.25$). Results in Table 11 and also Appendix E(ii) clearly shows that, there isn't any significant between the two groups when it comes to the areas of interest. The result also shows that, both

groups are familiar with the application of added fullness in garment designing than dart manipulation.

Table 13: Assessment of formally and informally trained dressmakers with the application of dart manipulation principle in garment

	1	2	3	4	5	Total	Mean
Assessment of test design 3	No	No	No	No	No	No	Score
Formally Trained							
D.A	1	0	1	1	0	3	2.67
D.T	0	1	2	0	0	3	2.66
C.O	0	0	0	0	3	3	5.00
S.T.D	0	0	0	2	1	3	4.33
A.R.T.D	0	0	1	2	0	3	3.66
F.T.D	1	0	0	0	2	3	3.66
Informally Trained							
D.A	4	0	0	0	0	4	1.00
D.T	3	1	0	0	0	4	1.25
C.O	1	0	1	2	0	4	3.00
S.T.D	0	0	4	0	0	4	3.00
A.R.T.D	1	1	1	1	0	4	2.50
F.T.D	1	2	1	0	0	4	2.00

Source: Researcher's field data, 2014

With the application of contouring principle in garment designing (Design 3), the general performance of both group were lower than their performance in the application of dart manipulation and added fullness principles. Irrespective of this, there were differences between the two groups as the mean scores of formally trained dressmakers' in design analysis (M=2.67), dart treatment (M=2.66), cutting out (M=5.00), sewing (M=4.33), achieving a replica (M=3.66), and fit of test design (M=3.66) were higher than the mean scores of informally trained dressmakers in design analysis

(M=1.00), dart treatment (M=1.25), cutting out (M=3.00), sewing (M=3.00), achieving a replica (M=2.50), and fit of test design (M=2.00). With reference to the dart treatment, both groups performed abysmally and it was reflected in the fit of the test design even though the fit of the contoured design on formally trained dressmakers' models were better than models of informally trained dressmakers. The application of this principle in garment designing requires the dressmaker to reduce the pattern within its frame so that the desired effect can be achieved. However, it was observed that, darts in the contoured design was treated the same way as dart in the dart manipulation design by informally trained dressmakers without any thought of reduction within the pattern's frame. This indicates that they were not knowledgeable about the use of contouring in garment designing.

It was also observed that, the formally trained dressmakers made use of working paper pattern with the application of contouring principle in garment designing. However, there were some mistakes that were observed during size adjustments of the working paper pattern. It was observed that dressmakers were reducing the frame of the working paper pattern from the outside (outline) instead of reducing the frame from within. To determine if these differences in mean scores between the two groups were statistically significant, the independent *t* test was employed and the outcome of the test is presented in Table 14

Table 14: Means, Standard Deviations, *T*-values and *P*-values for the application of contouring in garment designing by two groups of dressmakers

Form of training	N	M	SD	<i>t</i> - value	<i>p</i> value
Formally	322.00	3.20	5	-4.732	.005

****Significant $p < 0.05$, $M = \text{Mean}$, $SD = \text{Standard Deviation}$**

Source: Researcher's field data

With respect to hypothesis 3, results seem to be in discord with the null hypothesis which stated that, there is no significant difference between formally trained dressmakers and informally trained dressmakers with the application of contouring. From Table 14, the performance of formally trained dressmakers when it comes to the application of contouring ($M=22.00$, $SD=3.20$) is better than that of informally trained dressmakers ($M=12.75$, $SD=1.00$; $t(5)=-4.732$, $p=.005$). Hence, the null hypothesis is rejected. This principle is basically applied if the dressmaker wants to create a design that fit the contours of the upper torso. In using this principle, the pattern must be reduced within its frame to fit the dimensions of the body as dictated by the design. From Table 13 and Appendix E(iii), even though the means of formally trained dressmakers with respect to design analysis, dart manipulation and fit of test design were better than informally trained dressmakers, it is clear that both groups had difficulties in the aforementioned areas as compared to the mean scores that were recorded for dart manipulation principle and added fullness principle.

CHAPTR FIVE

SUMMARY, CONCLUSION AND RCOMMNDATIONS

Overview of Research Problem

The present nature of fashion calls for dressmakers to move along with the trend of producing innovative and creative garments that are well fitting and appealing to their customers' fashion sense. Joseph-Armstrong (2010) asserted that, for garment producers to achieve success in the field of garment production, they must have in-depth knowledge about design analyses, figure analyses, taking accurate body measurement, and know how to apply dart principles in creating and cutting unique styles. All these elements come to play when a dressmaker wants to construct a garment that is unique and well fitting.

Current published evidence in the area of clothing and textiles provide limited work that focuses on the importance of darts in garment designing and construction. It is in line with this that this research was carried out to assess the knowledge base of dressmakers' on the application of dart principles (dart manipulation, adding fullness and contouring) in garment designing.

Summary of the Study

The descriptive research design was employed for the study. Fifty dressmakers were sampled from the Central Region Dressmakers and Tailors Association through the multistage cluster sampling technique to serve as the participants for the study. The sampled dressmakers were made up of master craftsmen who had received either formal or informal training in dressmaking. The instrument used in the collection of data included observation checklist and semi-structured interview schedule (Appendix A and B). The research was carried out in Agona West Municipal District, Komenda/Edina/Eguafo/Abirem Municipal District and Cape Coast

Metropolitan District. The data analysis was done using descriptive statistics (frequencies and percentages) and inferential statistics (independent sample *t*-test).

Summary of the Findings

From the results of this study, the following findings were deduced. To draw or plot a styleline when developing patterns, it takes experience and practice. Ideally, drafting, draping and reverse engineering give a more liberal approach to developing paper patterns than freehand cutting technique. However, it was found that freehand cutting was the chief technique that dressmakers employed in making patterns.

With respect to darts, dressmakers knew that darts were a necessary feature for any well fitting garment. However, it was observed that dressmakers could not relate well with the elements that actually defined a dart when it comes to marking it out. As a result, the desired effect that the dart is supposed to create is not achieved.

In terms of applying dart principles in cutting out, it was revealed that of the three dart principles, dressmakers are more capable when designing garments with added fullness principle than dart manipulation principle and contouring principle. Observation made showed that dressmakers had problem with applying dart manipulation and contouring in cutting out as a result of their inability to mark out dart properly or accurately. Furthermore, it was noted that dressmakers hardly make use of shaping aids when plotting design details with the dart principles.

The study revealed that apart from added fullness, there were significant differences between formally trained dressmakers and informally

trained dressmakers in the application of dart manipulation and contouring in garment designing. In terms of the various elements that make up or define the application of dart principles, it was found that formally trained dressmakers were more capable than the informally trained ones with reference to design analysis, and dart manipulating or treatment. However, when it comes to cutting out pattern pieces and sewing of test designs, it was observed that there was not much difference between how both groups went about it.

Conclusions

The following basic conclusions were made from the results of this current study. In garment designing, darts play a major role and their use is dependent on how knowledgeable a dressmaker is about the elements, involved in applying the dart principles. The knowledge with which these elements are applied greatly influenced the end product. This is evident from what was observed in this study where a section of the participants did not know how to manipulate or treat the basic darts to achieve the desired effect.

Effective use of dart principles in garment designing irrespective of the cutting technique that is employed is dependent on the accuracy with which dressmakers take body measurement, mark out darts, and analyse design to know how to manipulate the basic darts to achieve the desired effect. Also, the accuracy with which the pattern pieces are separated is important for a successful garment designing. This is not to say that attention should not be given to how the pattern pieces are positioned on the design fabric. Cutting out pattern pieces in their appropriate grainline also influence the fit of the garment

In the application of dart principles in garment designing, there are certain thumb rules that influence the fit of the garment. These thumb rules include cross marking for notches, inputting appropriate fullness as required by the style, taking out ease and darts excesses where necessary, blending and trueing with the appropriate tools. The current study has brought to light the importance of preliminary stages such as taking accurate body measurement, design analysis, figure analysis, and pattern cutting technique that are involved in garment designing. The study has shown that the knowledge with which the primary stages are carried out influence the end product.

The study has also shown the importance of marking out darts accurately. Dart is the basic feature of a garment which when manipulated generates hundreds of design. Achieving the desired effect of a garment is greatly dependent on the knowledge with which the basic feature is marked out.

Again, the study has added to the previous knowledge that, dressmaker's knowledgebase on darts and its application in garment designing have an influence on their pattern development and cutting skills. In addition, it has provided knowledge that, dressmakers who are knowledgeable about dart principles are more likely to create unique designs than the category of dressmakers who are not. Finally, the study has provided documentation on the use of dart principles in garment designing by dressmakers in the central region. This can serve as a basis for further research.

Recommendations

During the study, it was observed that although dressmakers acknowledged darts as a necessary or basic feature for any well fitting

garment, they however underrated the importance of darts especially when it came to marking them out. As a result, they could hardly achieve the desired effect. Based on this finding, it is recommended that the importance of darts with special reference to marking it out accurately, should be emphasized more to dressmakers during workshops, seminars and general meetings that are organised by the association.

It is also recommended that the dressmakers and tailors association should incorporate a little theory on the preliminary stages involved in garment designing into their framework that is used in training apprentices. This will enable apprentices who will establish their own apparel production industry in the future, treat preliminary stages with much importance as cutting out and seaming.

Again, basic instructions needed to construct garments with the application of dart principles should be documented in simple terms and illustrations to aid dressmakers in their everyday work. This should be done by the researcher and other experts in the fashion industry. This will enable dressmakers to experiment with dart principles to become more creative.

In addition, it is recommended that an attempt should be made by individuals in the clothing and textiles field of study, to investigate how dressmakers understand other factors like matching styles with appropriate fabric type, laying out or plotting pattern pieces in appropriate directions and seaming. This is based on an observation made during the study; dressmakers selected fabrics for test designs based on their beauty (patterns and colourfulness) but not based on their suitability for the test designs and appropriateness for the study. This will give an overall picture of how

dressmakers understand and practice garment designing. Also, published works in this line will offer individuals in the fashion or garment production industry a wholesome view on garment designing by local dressmakers.

Suggestions for Further Studies

Base on the outcome of this study, it is suggested that

1. A follow up study can be conducted to ascertain customer satisfaction on the fit of custom made garments.
2. Other dressmakers from other regions can be assessed on the same topic so that a comprehensive generalization can be made.
3. A comparative study can be carried out to review methodologies used by established dressmakers who were formally trained in dressmaking and those who were informally trained, to bring to bear the impact each category have on their apprentices.
4. Dressmakers understanding of other elements involved in garment designing such as figure analysis, selection of styles to compliment fabric and constructional processes can also be investigated.

REFERENCES

Abban, C.K., & Quashie, S.O. (1993). Report on upgrading the technical and managerial skills of master mechanics and apprentices (Electronic

- version). *Journal of Education and Practice*, 5. Retrieved November 21, 2013 from <http://www.Ir.knust.edu.gh/bitstream>
- Adampsey, S. K. (2009). Vocational/Technical Education in Ghana: Problems and Remedies. *International Journal of Home Economics Research*, 1, 189-191.
- Adler, P.A., & Adler, P. (1998). *Peer power: Preadolescent culture and Identity*. New Brunswick, NJ: Rutgers University Press.
- Adu-Boahen, K. (2008). Mediating the Poverty of Girls' Education: Nineteenth-Century Ghanaian Women's Responses to the Subordinating Impact of Western Education (Electronic version). *Journal of African Culture and Civilization*, 1, 91-93.
- Aldrich, W. (1994/2008). *Metric pattern cutting for women's wear*. Oxford: Blackwell Science.
- Amedorme, S.K., & Fiagbe, Y.A.K. (2013). Challenges Facing Technical and Vocational Education in Ghana. *International journal of scientific & technology research*, 2, 253-254, Retrieved December 18, 2013 from <http://www.ijstr.org>.
- Ashdown, S.P. (2007). *Sizing in Clothing: Developing effective sizing systems for ready to wear clothing*. Cambridge, England: Wood Head.
- Baker, M.M. (2007). *Darts, Ease, Gathers, Pleats, Shirring, Tucks*. University of Kentucky Cooperative Extension. Retrieved July 20, 2013 from <http://www2.ca.uky.edu/hes/fes/FACTSHIS/CT-MMB-182.pdf>.
- Biney- Aidoo, V. Antiaye, E. & Oppong, J. A. (2006). *An assessment of the apprenticeship system as a means of acquiring sewing skills*. Retrieved October 20, 2013, from <http://www.iiste.org>.

- Blackboard pro Ed, Disappointed with formal training (n.d). *Why formal training?* Retrieved December 17, 2013, from <http://www.blackboard.com/proEd>.
- Boateng, C. (2012). Restructuring Vocational and Technical Education in Ghana: The Role of Leadership Development. *International Journal of Humanities and Social Science*, 2, 4 – 20.
- Bordens, K. S. & Abbot, B. B. (1996). *Research design and methods: A process approach* (3rded). Mountain View, CA: Mayfield Publishing Company.
- Bortei-Doku, A. E., Doh, D. & Andoh, P. (2011). *Study of Attitudes towards Technical and Vocational Education and Training in Ghana*. Centre for Social Policy Studies, University of Ghana.
- Brown, P. & Rice, J. (2001). *Ready-to-wear apparel analysis* (3rded). Prentice Hall: Pearson Education, Inc.
- Collins English Dictionary. (2005). *Dressmaker* (13thed). New York: Happer Collins Publishers Inc.
- Danquah, P.A. (2010). *The Effect of Thread Type, Stitch Density and Washing on Seam Performance of a Ghanaian Real Wax Cotton Printed Fabric*. An Mphil. Thesis presented to the Home Economics Department of University of Cape Coast, Cape Coast.
- Fianu, D.A.G., Acquah-Harrison, P. (1999), *The Apprenticeship System of “Wayside” Seamstress from Selected Neighbourhoods in Accra*, Asian Regional Journal of Home Economics (ARAHE), Vol. 6, 3-8
- Fischer, A. (2009). *Basic Fashion Design 03, construction*. Switzerland: AVA Publishing SA.

- Forster, P. (2009). *Freehand cutting made easy* (2nded) Accra, Ghana: MidlandPress Ltd.
- Forster,P. &Ampong,I.(2012) *Pattern cutting skills in small scale garment industries and teacher education universities in Ghana*. International Journal of Vocational and Technical Education Vol. 4(2), pp. 14-24. Retrieved September 18, 2013, from <http://www.academicjournals.org/IJVTE>
- Gay, L. R. (1992).*Educational Research: competencies for analysisand application* (4thed). Upper saddle river, NJ: Merrill/ Pearson Education.
- George, D.&Mallery, P. (2003).*SPSS for windows step by step: A sample Guide & reference*. 11.0 update (4thed). Boston: Allyn& Bacon.
- Hardford, J. (1974). *Professional Patternmaking for Designers of women's wear*. New York: Fairchild Publication Inc.
- Hollen, R. N. &Kundel, J.C. (1992). *Pattern making, by the flat method*.New York: Macmillan Publishing Company.
- Jeffreys, C. (2006). *The complete book on sewing*.London: Dorling Kindersley Limited.
- Joseph-Armstrong, H. (2010).*Pattern Making for Fashion Design* (5thed).New Jersey: Pearson Education, Inc.
- Josephson, C.L (2010). *Mama said sew: stitched sampler, contemporary art and domestic craft*. MA (Master of Arts) thesis, university of Iowa, retrieved December 19, 2013, from <http://www.ir.uiowa.edu/etd/827>
- Kaiser, S. B. (1985).*The social psychology of clothing and personal adornment*. New York: Macmillan publishing company.

- Keiser, J. S. & Garner, B. M. (2003). *Beyond design*. New York: Fairchild Publication Inc.
- Kontos, S. (1999). *Preschool teacher's talk, roles, and activity setting during free play*. *Early childhood Research Quarterly*, 14(3), 363-382.
- LaPere, C. (2006). *The effects of different fabric types and seam designs on the seams efficiency*. Retrieved October 11, 2013 from <http://dspace.emich.edu:8443/dspace/bitstream/1970/365/2/theshon06LaPereC.pdf>.
- Leedy, P.D. & Ormrod, J.E. (2010). *Practical Research Planning Design*. New Jersey: Pearson Education Inc.
- Lindqvist, R. (2013). *On the logic of pattern cutting: foundational cuts and approximation of the body*. Thesis submitted to University of Borås studies in artistic research. Retrieved from <http://www.lindqvistLic.pdf>
- Longman Dictionary of contemporary English, (2003). *Vocational training*. (4thed). New Jersey: Pearson Education Inc.
- Mckillop, S. (n.d). Unique guide to fit. Retrieved October 15, 2013 from <http://www.uniquepatterns.com>
- Ng'ethe, N. & Ndua, G. (1992). *Jua Kali education, training and welfare: A study of carpentry and metal-work in the Eastlands of Nairobi*. An Mphil thesis presented to the Institute for Development Studies, University of Nairobi, Nairobi.
- Nunnally, J. (1978). *Psychometric Theory*. USA: McGraw-Hill.
- Odotei, K.I. (2008). *History of Formal Education in Ghana*. Accra. Ghana: sub-saharan publishers.
- Palmer, P. & Alto, M. (1998). *Fit for real people*. Colorado Springs: Palmer/Pletsch Publishing.

- Polit, D. F., & Hungler, B. P. (1999). *Nursing research: Principles and methods*. (6th ed). Philadelphia: Lippincott.
- Pritchard, C. (2013). *Exploring the relevance of manual pattern cutting skills in a technological environment*. Master's thesis submitted to the University of Bedfordshire, England. Retrieved October 26, 2013, from <http://www.hdl.handle.net/10547/294279>; Title: Exploring the relevance of manual pattern...
- Ragin, C. & Becker, H. S. (1992). *What is a Case? Exploring the Foundations of Social Inquiry*. Cambridge: Cambridge University Press.
- Read, M. E. (1995). Apparel manufacturing glossary for application protocol development. Retrieved October 20, 2013, from [http://www.nist.gov/./nistir 5572.pdf](http://www.nist.gov/./nistir%205572.pdf)
- Sarpong, G. D., Howard, E. K., & Osei-Ntiri, K. (2011). Globalization of the fashion industry and its Effects on Ghanaian independent fashion Designers (Electronic version). *Journal of Science and Technology*, 3, 97 – 106
- Shoben, M. & Ward, J. (1987). *Pattern cutting and making up*. Oxford: Heinemann Professional Publishing.
- The small shack. (2009). *Ghana boosts apprenticeship for jobless young women*. Retrieved December 17, 2013, from <http://www.journalism.nyu.edu>.
- Turlings, Y. (2002). *Ghana investment profile*. Retrieved October 20, 2013 from <http://www.ghana.textileenews.org>

Uwameiye, R. &Iyamu, O. S. (2010).*Training Methodology Used by the Nigerian Indigenous Apprenticeship System*. Retrieved October 15, 2013 from <http://www.iizdvv.de/index.php>

APPENDICES

APPENDIX A

SEMI-STRUCTURED INTERVIEW GUIDE

The purpose of the interview is to solicit information on dressmakers' knowledge base on patternmaking principles in garment construction. Please

answer these questions sincerely. The information gathered would be treated as personal and confidential.

Questions to elicit information on patternmaking

1. What method (s) do you use for making garments?

.....
.....
.....
.....

2. Do you have any knowledge about patterns?

Yes [] No []

3. What are patterns?

.....
.....
.....

4. Mention some of the ways through which patterns can be developed

.....
.....
.....

5. Does your establishment use patterns?

Yes [] No []

6. If yes, how often do you use patterns?

Always []

Most of the time []

Sometimes []

Rarely []

7. Can you draft the basic block pattern?

Yes [] No []

8. If yes, what measurement do you use for drafting the basic block pattern?

Standard measurement []

Clients body measurement []

Convenient measurement []

9. Do you analyze the figure of your clients?

Yes [] No []

10. If yes, what is entailed in analyzing a client's figure?

.....
.....
.....

11. Are patterns easy to use?

Yes [] No []

12. What is/are the reasons for your answer?

.....
.....
.....
.....

Questions to elicit information on darts

1. Do you know of the various types of darts?

Yes [] No []

2. What purpose do dart play in garments?

.....
.....
.....

3. How do you locate/mark the position for darts?

.....
.....
.....
.....

4. How do you ensure that darts are of the same length on each side?

.....
.....
.....

5. How do you press a dart?

.....
.....
.....

6. Does the dart shape affect the fit of garments?

Yes [] No []

7. If yes, how does the dart shape affect the fit of garment?

.....
.....
.....

8. Does the dart length affect the fit of garment?

Yes [] No []

9. Give a reason for your answer

.....
.....
.....

10. Does the dart size affect the fit of garment?

Yes [] No []

11. Give a reason for your answer

.....
.....
.....

12. Will the dart for all clients be constructed the same way?

Yes [] No []

13. Give a reason for your answer

.....
.....
.....

14. Are you able to analyze designs to know how darts have been manipulated?

Yes [] No []

15. Mention some of the ways that dart can be used to create a unique design

.....
.....
.....

APPENDIX B

OBSERVATION GUIDE

Using your knowledge in patternmaking, analyze each style and demonstrate how you will plot, cut and sew each design.



Front view Back view

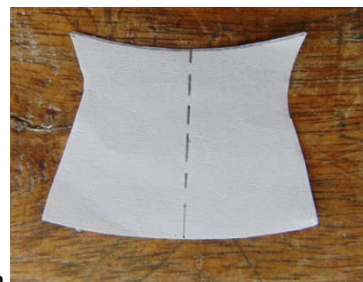
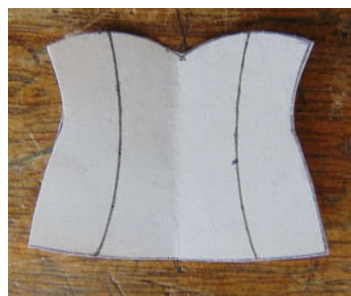
Design 1. Manipulated dart design



Front view

Back view

Design 2. Added fullness design



Front view

Back view

Design 3. Contoured design

Observation checklist for measurements

Area of interest	Record
Tools and materials for measuring	
Measurement taken for design 1	
Measurement taken for design 2	
Measurement taken for design 3	
How measurements were taken for Design 1	
Design 2	
Design 3	
The amount of fabric needed for Design 1	
Design 2	
Design 3	

Observation check list for the application of dart principles

observation	Record for designs		
	1	2	3
Tools and material			
Method used to transfer measurements for design details			
Location of dart points, curves and design lines			
Manipulation/ Treatment of darts			
Determination of fullness			
Perfecting of lines and curves			
Total time spent on plotting, cutting and sewing			

Guideline for scores allocation for design assessment: Tick (√) if observed.

Design analysis (D.A)

1. Indicated creative elements in the design

2. Indicated basic darts involved
3. Indicated the dart principle involved
4. Indicated how the dart principle have been used in the design
5. Indicated the effect of the dart principle in the design

Dart Manipulation/Treatment of Test Design (D.M)

1. Indicated the darts to be treated
2. Indicated new location of dart points, curves and stylelines
3. Appropriate dart treatment
4. Appropriate determination of fullness or reduction where necessary
5. Appropriate plot of patterns for design

Cutting Out of Test Design (C.O)

1. Appropriate use of fabric
2. Appropriate use of tools
3. Appropriate transfer of measurement for design and input of allowance
4. Blending, and trueing for perfect curves and lines
5. Labeling of pattern pieces as they are cut out

Sewing of Test Design (S.T.D)

1. Tucking of pattern pieces before stitching
2. Appropriate stitch strength
3. Pressing of pieces during sewing
4. Appropriate attachment of fasteners
5. Appropriate treatment of allowance

Achieving a Replica of Test Design (A.R.T.D)

1. Appropriate analysis of design
2. Appropriate treatment of darts

3. Appropriate plotting of design
4. Appropriate seaming of pattern pieces
5. End product is an exact replica of test design

Fit of Test Design (F.T.D)

1. Seamlines line smoothly over the body
2. Absence of pulls, wrinkles or buggy areas
3. Vertical side seams hand straight
4. Hemline is even and parallel to the floor
5. Yoke is well attached to lower section/ princess stylelines passes through the bust point/ styleline is well contoured above and between the bust

Design assessment

Aspects of interest	Scores				
	1	2	3	4	5
1. Analysis for design 1					
2					
3					
2. Manipulation of the basic darts to achieve replica of test design 1					
2					
3					
3. Cutting out of test design 1					
2					
3					
4. Sewing of test design 1					
2					
3					
5. Achieve a replica of the test design 1					

2					
3					
6.Fit of design 1					
2					
3					

Background Information

1. Sex: Female []

Male []

2. Form of education: Formal [] Informal []

3. If you were formally trained, what level did you attain?

.....

.....

.....

4. How were you trained to acquire the skills of sewing?

Apprenticeship []

Vocational school []

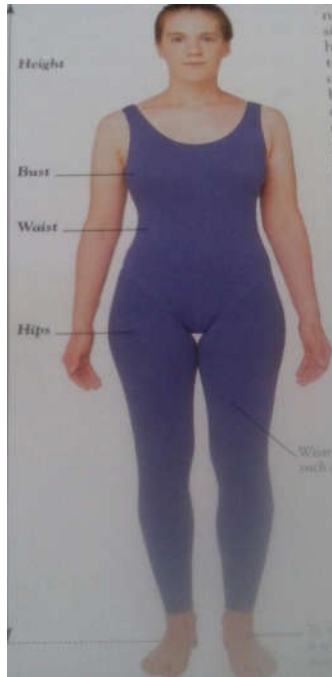
Secondary school []

Picked out of interest []

Skill training programme []

APPENDIX C

**ILLUSTRATION OF HOW TO TAKE BODY MEASUREMENTS
ACCURATELY (Source: Jefferys, 2006)**



I. Taking of height measurement



II. Taking of hip measurement



III. Taking of waist measurement



IVa. Taking of bust measurement



IVb. Taking of high bust measurement
measurement

V. Taking of bust point measurement



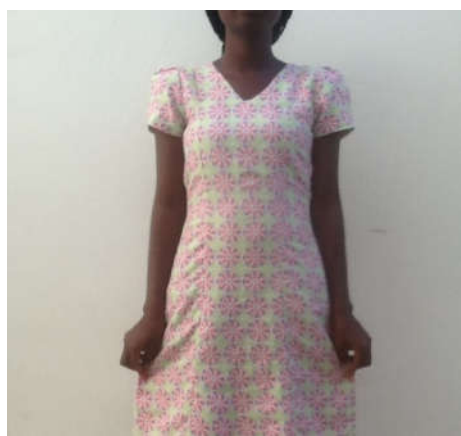
VI. Taking of neck-waist measurement **VII.** Measuring of shoulder length



VIII. Taking of skirt length measurement

APPENDIX D

PICTURES OF SEWN TEST DESIGNS



130



I.A well constructed design 1(Front and Back view)



II.A poorly constructed design 1(Front and Back view)



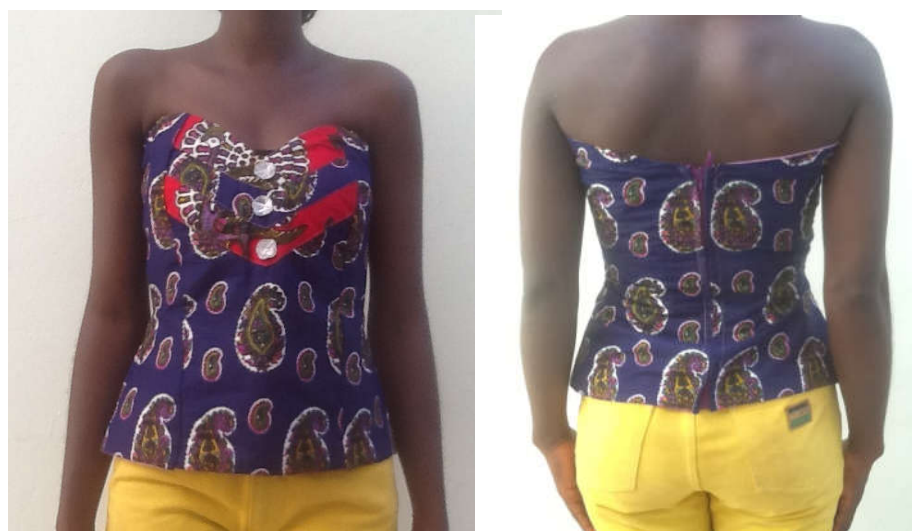
III. A well constructed design 2 (Front and Back view)



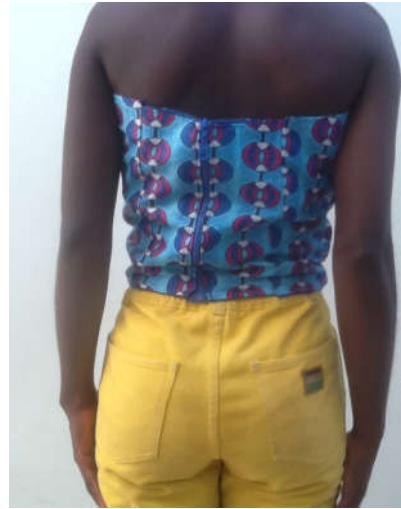
IV. A poorly constructed design 2 (Front and Back view)



V. Associated wearing and removal problem of design 2



Vi. A well constructed design 3 (Front and Back view)



VII. A poorly constructed design 3 (Front and Back view)



VIII. Associated constructional problems of design 1 (uneven side seam allowance and hem)



IX. Associated constructional problems of design 3 (sewing of dart intake)

APPENDIX E

Differences between formally and informally trained dressmakers with the application of the dart principles in garment designing.

I. Assessment of Dart Manipulation Design

Area of interest	Formally trained dressmakers		Informally trained dressmakers	
	M	S.D	M	S.D
D. A	3.00	1.000	1.75	0.500
D.M	4.33	1.154	3.25	0.957
C.O	5.00	0.000	3.25	0.957
S.T.D	5.00	0.000	3.25	0.957
A.R.T.D	4.66	0.577	3.75	0.500
F.T.D	4.00	1.000	3.00	1.154

II. Assessment of Added Fullness Design

Area of interest	Formally trained dressmakers		Informally trained dressmakers	
	M	S.D	M	S.D
D. A	2.67	0.577	1.00	0.000
D.M	2.66	0.577	1.25	0.500
C.O	5.00	0.000	3.00	0.816
S.T.D	4.33	0.577	3.00	0.816
A.R.T.D	3.66	0.577	2.50	0.000
F.T.D	3.66	0.577	2.00	0.816

III. Assessment of Contouring Design

Area of interest	Formally trained dressmakers		Informally trained dressmakers	
	M	S.D	M	S.D
D. A	3.33	0.577	1.50	0.577
D.M	4.33	0.577	2.25	0.957
C.O	5.00	0.000	3.25	0.957
S.T.D	4.33	0.577	3.25	0.957
A.R.T.D	4.00	0.000	3.25	0.957
F.T.D	3.66	0.577	2.57	1.258