VIDEO DOCUMENTATION OF BROADLOOM WEAVING PROCESSES FOR EFFECTIVE TEACHING AND LEARNING OF FABRIC WEAVING IN SENIOR HIGH SCHOOLS IN KWAHU EAST AND EAST AKIM DISTRICTS

BY

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DECLARATION

I hereby declare that this submission is my own work towards the M.A and that to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the university, except where due acknowledgement has been made in the text.

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ABSTRACT

Over the years, there has been a gap between school-based weaving and community-based weaving technologies. This gap so created is as a result of some textiles teachers who lack the basic skills to handle practical weaving on the broadloom in Senior High Schools pursuing textiles. This study, addressing the gap so created, has identified and described broadloom equipment, materials and systematic processes involved in broadloom weaving. A video documentary on broadloom equipment, materials and systematic processes involved in broadloom weaving has been developed and field tested to reveal its strength as a teaching tool to facilitate the teaching and learning of textiles in public and private Senior High Schools. Three phases make up the entire project. Phase One deals with interviews conducted and observations made at public and private Senior High Schools and local broadloom weaving centres. Phase Two contains the Video filming processes and its content. Phase Three, the final phase involves using the video as a tool for teaching in the classroom. Time spun used by the researcher for field-testing of the documentary was short so more extensive testing and use of the video is needed to refine and improve its effectiveness as a teaching tool. The reality of this project, however, depends solely on the heads of Senior High Schools whose duty is to furnish their schools with the needed weaving equipment, accessories and materials for practical weaving.

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- Presbyterian Senior High School, Abetifi – Kwahu.
- Ofori Panin Senior High School, Kukurantumi – Akim.
- Christian Heritage Senior High / Technical School, Kukurantumi – Akim.
- IPS Senior High / Technical School, Kukurantumi – Akim.

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K. D

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CHAPTER ONE

INTRODUCTION

1.0 **Background to the Study**

When the word “Textile” is mentioned, the idea of weaving quickly comes to mind. This may be due to the fact that the word textile was derived from the old Latin word “TEXERE” which means “to weave”. Over the years, the word has undergone through different dynamic changes that have resulted in a wider scope to embody development of different fibres and fabric manufacturing and important methods. Presently, textiles mean more than simply weaving, which is only one of the various ways of making a fabric. Other fabric manufacturing methods include: stitch-bonded fabrics, knitting, appliqué, net, lace, film fabrics, and others.

There are various opinions in the origin of weaving. Some believe that it started from the river valleys of China, India, Mesopotamia or Egypt and spread to other parts of Europe and Asia. The invention of weaving, as believed by another school of thought, developed independently in various parts of the world. Some, like the Ashanti, believe it came to humans who studied the web of spiders.

Weaving, being one of the components of textiles, plays an important role in the socio-economic development of Ghana. It has been and is still part of Ghanaian culture. Weaving products such as Fugu and Kente are converted to different artefacts which go a long way to preserve, sustain and transmit Ghanaian culture from one generation to the other. These products are also sold for money and at times given out as souvenirs to foreigners who visit the country. Apart from Kente and Fugu, other woven fabrics are used in many ways to serve the needs of man all over the world.

Woven fabrics are used to protect the body of the wearer against the harsh conditions of the weather such as cold, sun, fire and others. In the medical field, doctors and nurses use disposable textile products and garments and, with modern technology, human life can be prolonged by the use of textiles where worn out human parts can be replaced with polyester arteries and velour heart valves. There are also bullet-proof vests which protect soldiers, hunters and politicians. In the home, fabrics such as curtains, woollen carpets, upholstery, bed sheet and others are used as furnishing fabrics.

It is a fact that cannot be disputed that the inclusion of weaving in the textile syllabus for Senior High Schools has a lot of importance which some teachers and students may not be aware of. Apart from the above importance of fabrics mentioned, weaving is a form of therapy. The tedious and time consuming processes involved in weaving and the delicate nature of yarns used demand that students who participate in fabric weaving develop the habit of endurance, patience, self-control, problem solving, careful thinking and self-confidence unconsciously. Students develop these good habits despite any other negative characteristics they may possess.

Thanks to the community and some higher institutions of learning, broadloom weaving is still surviving and as such cannot be termed as a thing of the past. Few of such places are Kumasi Cultural Centre, Kwame Nkrumah University of Science and Technology Textile Weaving Studio, University College of Education-Winneba Textile Weaving Studio, just to mention a few.

1.1 **Statement of the Problem**

Traditionally, textiles refer to woven fabrics. The term is now generally applied to fibres, yarns, fabrics or products made of fibres, yarns and fabrics.

Weaving processes involve systematic practical procedures that must be strictly followed to arrive at the right product. The teaching of these processes pose technical problems to textiles teachers in Senior High Schools and so fabric weaving is not taught by all textiles teachers although broadloom weaving goes on in many communities in Ghana. This has resulted in a gap between school-based weaving and community-based weaving technologies. This gap can be attributed to the fact that textiles teachers lack basic skills and technical know-how of weaving.

Visits to some Public and Private Senior High Schools in the East Akim and Kwahu East Districts in Eastern Region revealed that some of the teachers who teach textiles are not graduates of the subject and as a result, they lack the requisite skills and technical know-how to teach fabric weaving processes effectively. Further observations made on fabric weaving also revealed that broadloom weaving in these Districts has not received the needed attention as required.

Incompetence on the part of some textiles teachers has had negative effects on their students. Some students are compelled to take their West African Senior High School Examination weaving projects outside the schools for help because they had not been taught the required skills to meet the demands of the project. Those who are able to make it to the various Universities after their Senior High School education to pursue textiles are also not able to cope with the high standards of weaving required. This study therefore examined the problems facing the teaching and learning of fabric weaving in Public and Private Senior High Schools and how these problems could be solved through the use of video documentation of

broadloom weaving processes in order to close the gap between school-based weaving and community- based weaving technologies and enhance the teaching and learning of textiles in schools. It is believed that this would, in the long way, sustain the interest of teachers and students in fabric weaving.

1.2 **Objectives of the Research**

1. To identify and describe broadloom weaving equipment, accessories and materials.
2. To identify and describe in systematic order, the processes involved in broadloom weaving.
3. To document broadloom weaving processes using video camera and tape.
4. To field test the video in one Senior High School in Kwahu East District to determine its effectiveness as a teaching tool for weaving.

1.3 **Research Questions**

1. What are the broadloom weaving processes and how are they carried out?
2. How effectively will video documentation of broadloom weaving processes facilitate the teaching and learning of fabric weaving in Senior High Schools?

1.4 **Delimitation**

This research was restricted to fabric weaving on the broadloom that has only one set of lams. The structure of the fabric was plain weave only.

1.5: **Limitations**

1. The researcher was not granted permission in some Senior High Schools he visited to collect data. This made him rely on few schools that gave him permission to collect data from their institution.
2. Due to limited time available, the researcher could only field-test the video at one school - Abetifi Presbyterian Senior High School.

1.6 **Definition of Terms**

1. Weaving: The method of forming fabrics by interlacing two sets of yarns, *warp and weft*, at right angles to each other.
2. Fibre: A unit, either natural or man-made, which forms the basic element or 'building block' of fabrics and other textile structures.
3. Knitting: A fabric structure made by interloping yarns.
4. Lace: An open-work cloth with a design formed by a network of threads made by hand or on special lace machinery, with bobbins, needles or hook.
5. Hank: A hank in cotton trade refers to 840 yards in length of cotton yarn.
6. Appliqué: A method of stitching one fabric on top of another with fine hemming stitches or by machine.
7. Net: An open – structure fabric in which yarns are knotted to provide shape, form and design.
8. Crocheting: A fabric production process using a hook, thread and the hand.
9. Braiding: The process of forming a narrow textile structure by plaiting several strands of yarn.
10. Tapestry: A weaving technique in which coloured weft yarns are used to produce designs and pictures in a fabric by picking with the hands.

11. Embroidery: A decorative or ornamental stitches produced with threads or yarns on a fabric.
12. Printing: A process of applying colour patterns to the surface of yarns or fabrics.
13. Spinning: A process or processes used in the manufacture of yarns and of filament fibres.
14. Finishing: A process of adding substance or combination of substances to a textile to improve its properties.
15. Twist: As in yarn preparation, is the number of turns per inch of a yarn.
16. Cheese: It is a cylindrical pack of a yarn.
17. Cake: It is a pack of yarn in a rounded form.

1.7 **Abbreviations**

1. KNUST - Kwame Nkrumah University of Science and Technology.
2. SHS -Senior High School.

1.8 **Importance of the Study**

There is no doubt that lessons are enjoyed and most remembered when they are taught with instructional materials with learners taking active part by doing. Pastore (2002) quoting Dale's Cone of Experience with regard to the principles of teaching opines that "learners are able to remember ninety percent of what they say and they do in the teaching process" (http:/rapidbi.com). Because weaving is technical and involves processes that are complex, the ability to understand and recall will be improved if it is taught with the use of audio-visual aids. By this, students get involved in the doing process.

The processes involved in weaving impart good moral habits such as confidence, patience, endurance, tolerance, self control, careful thinking and proper planning which prepared students to be good future leaders. The developed video documentary also imparted visual information to teachers and students as they watched and put into practice what they saw.

This project will encourage broadloom weaving in Senior High Schools and contribute to effective use of broadlooms that are available in schools but have received little attention over the years.

Through this project, students would gradually cultivate the habit of carrying out their own weaving projects set by the West African Examinations Council. This would consequently prepare them well in order to cope with the high standards of weaving required in higher institutions of learning.

1.9 **Organization of the Rest of the Text**

The breakdown of the subsequent chapters of this project are as follows:

Chapter Two entails review of related literature. Under this chapter, the researcher reviewed literature on ancient history of weaving, development of the weaving loom, weaving tools and accessories, the principles of weaving, broadloom weaving processes (Designing, Warp laying, Raddling, Beaming, Heddling, Reeding, Tie-up, Weft preparation and Weaving) and finally, principles of teaching and learning.

Chapter Three deals with research methodologies used in this study. Under this chapter, qualitative research approach was discussed. Based on this approach, descriptive and action research methods were explained. The researcher also explained library research, weaving studio research, population for the study, sampling technique, data collecting instruments, interview, observation, validation of

instruments, administration of the research instruments and primary and secondary data. The phases of the project have also been explained under this chapter.

Chapter Four entails assembly of data and the discussion of main findings. Analysis has been made and interpretation of results also discussed.

Chapter Five consists of summaries of the study and findings, conclusions and recommendations. The reference has been presented in alphabetical order according to the surname of the authors from books and internet sources followed by appendices.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 **Introduction**

By far, students enjoy and take active part in practical lessons when teaching and learning involves audio – visuals. Instructional videos in the classroom have the advantage of presenting abstract ideas in a realistic context, which helps learners to grasp the abstract ideas more easily and to retain the material longer. Most practical lessons inculcate into students essential qualities and skills. Weaving on the broadloom, as a problem solving craft, is no exception. The processes involved in weaving builds confidence, patience, endurance, tolerance, self control, careful thinking and proper planning in students. In matters of unemployment, this country is in serious crisis and this problem, to some extent, can be arrested when students are taught the skills of weaving which can equip them with skills to earn a living in case they drop out of school.

For easy review of literature related to this project, the main topic has been divided into sub-topics and is listed below.

- History of weaving
- Development of the weaving loom
- Weaving tools and accessories
- The principles of weaving
- Broadloom weaving processes
- Principles of teaching and learning

2.1 **History of Weaving**

Weaving is an old art recorded by history. Although there were no mechanical looms for weaving during the early civilisations, highly skilled weavers were able to produce fine quality fabrics, some of which have been found in the

tombs of ancient Egypt. There is no doubt that designs that were made on most ancient Egyptian pottery provide enough evidence of early skilled in weaving (Marjory 1966). Lord & Mohamed (1992), commenting on the history of weaving, opine that “human beings have clothed themselves with woven materials since the dawn of history, and the history of civilization is also, to some extent, the history of weaving”. Lord & Mohamed, quoting Aitken opine “There is evidence that the Egyptians made woven fabrics over 6000 years ago and it is believed that in prehistoric times, lake dwellers in Europe made nets from twisted threads”.(p.1)

Indeed, weaving is as old as civilization. The first man used leaves to cover himself when he realised his nakedness. These leaves were used to cover only the private parts. Later, animal skins acquired through hunting and bark of trees were considered better to fight cold with than leaves. As time went on, men not only thought of covering the body with just anything but also the conformability of the covering. This necessitated the use of animal furs and vegetable fibres which eventually led to the art of spinning and weaving (Sackey 2002).

It is also evident from the literature cited that prehistoric man introduced the skill of hand spinning or twisting of natural fibres into continuous strand or yarn which he used for weaving. The skill of warp tensioning which facilitates shedding and makes weaving possible was also introduced in the early civilization. Other skills such as shedding, weft insertion and beat-up which finally produce the fabric were all prominent in early weaving. These principles which were involved in early weaving are the same principles used in modern weaving. However, there has been, as a result of technology, massive and tremendous improvement in the way these principles are carried out in modern weaving.

2.2 **Development of the Weaving Loom**

Looms for weaving broad cloths and the weaving process as a whole, have gone through a lot of developmental and structural stages. Lord and Mohamed (1992) stated that “In early looms, the main structural components were very simple; the warp was tensioned by individual weights and the filling was inserted by a suitable shaped stick or such-like” (pp 22-23). Commenting further on the functions of warp control where the warp is released into the weaving area for weaving, the authors state that filling or weft insertion and beat-up are recognizable in these primitive looms, but the function of shedding is almost completely absent. This was so because a shaped stick was used to pick the individual warp yarns to be raised one after the other before weft or filling insertion.

It can be said that clear shed opening for weft insertion was not easy to attain. Furthermore, there was no readily recognizable process which corresponds to what is today called warp preparation. The yarns used as warp were simply suspended on a crossbar with tension load at the bottom in order to make picking possible. As the loom developed in structure and in operation, the function of shedding became more apparent, presumably because a well organized shedding system made it easier to insert the filling. However, the process was still very much a discontinuous one and was limited to the piece weaving; hence there was little need for yarn preparation as we know it. With the advent of Kay’s shuttle, a distinct warp shed was essential to pass the shuttle; also it was necessary to wind quills or pirns to fit into the shuttle. By this time, too, rudimentary warp beams were in the use and another aspect of yarn preparation was established. As the improvement in the quality of warp yarns increased, so it became technically feasible to operate the loom faster (Lord and Mohamed, 1992).

Inferring from the above, weaving processes are intertwined and flow freely from one stage to the other which consequently makes weaving continuous rather than discontinuous. Problems with shedding and weft insertion was an obstacle to continuous weaving in early looms. When these problems were solved, and with the introduction of John Kay's shuttle in Britain in 1733 (Marjory, 1992), weaving was done at a faster rate and production in terms of quantity was increased.

Marjory (1966) also said that early looms were very crude compared with modern mechanical weaving machines. Nonetheless, all looms or weaving machines, old and new, have basic operating principles that are alike. There is always a system to hold the long warp yarns under tension; there is a way to spread warp yarns apart in some arrangement so that the crosswise yarn can be laid through the opening or shed formed; and there is a devise to pack the crosswise yarns into position.

Commenting further, Marjory said that until the early nineteenth century, weaving was done primarily by hand. In the late 1700s and 1800s scientist, inventors, and engineers such as Joseph Marie Jacquard and Edmund Cartwright, developed weaving looms in Britain that were partially machine-powered. Gradually, looms that were completely mechanical took over and tremendous changes have since occurred in loom design and operation and in how the pick yarn is laid.

Marjory further said that the warp beam holds the lengthwise yarns. It is located at the back of the loom and is controlled so that it releases yarn to the weaving area of the loom as needed. The heddles are wire or metal strips with an eye located in the centre through which a warp end is threaded. The harness is the frame that holds a group of heddles in position. Each loom has at least two harness, and most have more - from four to as many as thirty two (32), depending on the type of

fabric to be woven. Harnesses can be raised or lowered in order to produce the shed through which the filling (or weft) yarn is passed to provide the crosswise yarn.

The above literature on major components of the loom shows clearly how innovative some people were in transforming the loom to its present state. Skills in innovation are very essential to the economic growth and development of every nation. As future leaders, students will do the nation well if they learn to be innovative. The current state of the broadloom can be further developed to improve its productivity.

For easy understanding of the literature on weaving tools and accessories, the parts of the loom and their functions as well as the accessories for weaving and their use precede the literature.

Figures 1 and 2 are the sketches of the broadloom. The parts are labelled with numbers that correspond to the name of the part and function as explained below the loom. Fig.1 below is the broadloom, its parts and functions.

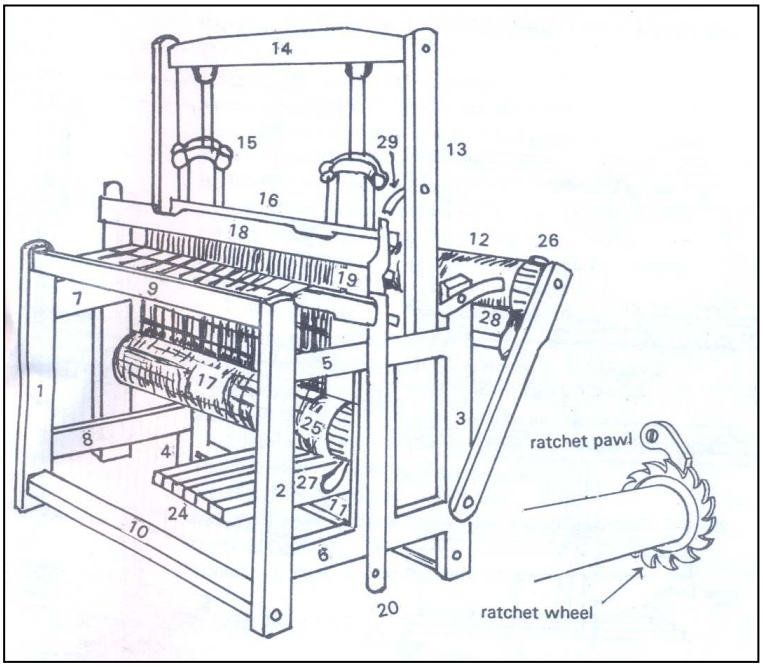


Fig. 1 The broadloom, its parts and functions

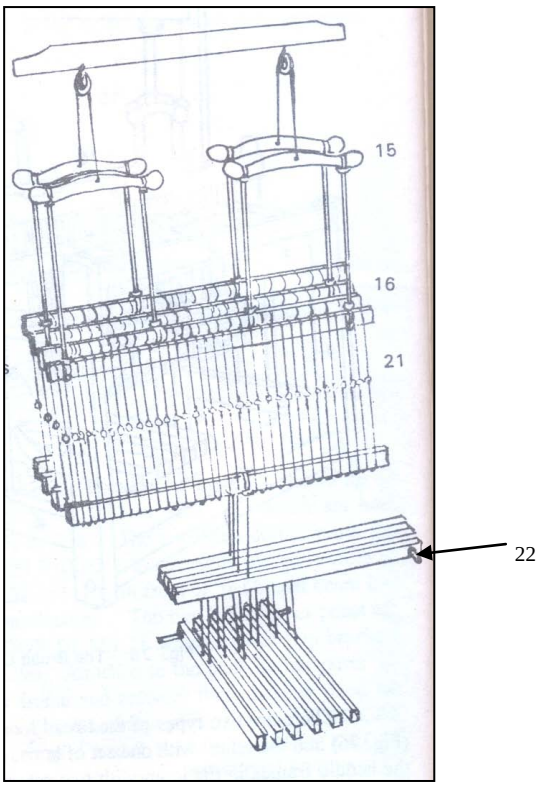


Fig. 2

A broadloom part with one set of lams

Number(s)	Name of part	Function
1,2,3,4	Corner or Upright posts	Form the main framework of the loom.
5,6,7,8	Cross beams	
9	Breast beam	
10,11	Floor beams	
12	Warp beam	- Carries the warp yarns.
13	Vertical beams	- Carry the horses' cross bar.
14	Horses' cross bar	- Suspends the set of horses.
15	Horses	- Suspend the heddle frames.
16	Heddle frame	- Carries the heddles or healds and raises groups of them to form a shed when a treadle is depressed.
17	Cloth beam/Cloth roller	- Carries the woven fabric.

18 -	Beater/Sley	used to beat up the newly inserted weft
19 -	Reed	to the fell of the woven fabric.
20 -	Reed/Sley swords	- Carry the reed case.
21 -	Heddle/Heald (Fig. 2)	- Separates individual warp yarns to create a shed when a treadle is depressed.
22 -	Lams (Fig. 2)	- Control the movement of the heddle frames.
24 -	Treadles/Foot pedals	- Helps to open a shed when depressed.
25 -	Ratchet wheel	- Winds up the woven fabric.
26 -	Ratchet wheel	- Releases the warp
27,28 -	Ratchet Pawl	- Prevent the ratchet wheels from moving in the opposite direction.
29 -	Handle	- Used to release the warp beam.

Accessories for broadloom weaving are the pieces of equipment which do not form part of the main loom but make the broadloom functional, useful and more attractive. In fact, without these accessories, practical weaving on the broadloom cannot be possible. Below are the pictures of the accessories for weaving and their use in the weaving process.

Shuttle with bobbin

Bobbin Winder

Spool Rack

Beaming Box

Castle

Raddle

Threading Hook

Bobbins with thread

Skein Winder with Hank

Reed Hook

Warping Mill

Plate 1. Weaving accessories

Name of Accessory	Function
Warping board/mill	- Used for warping.
Skeiner/skein winder	- Used to unwind hanks.
Bobbin winder	- For winding yarns unto bobbins.
Bobbin	- Used for carrying weft yarns.
Spool rack	- Used to unwind yarns from bobbins.
Shuttle	- Carries weft yarns on bobbin.
Castle	- Used to check the height of the heddle frames for levelling before the tie up.
Threadling/heddling hook	- For passing the warp yarns through the eyes or loops of the healds or heddles.
Reed hook	- For passing the warp yarns through the dents of the reed.
Raddle	- For spreading and beaming the warp.
Beaming box	- For warp tensioning before beaming.

2.3 **Weaving Tools and Accessories**

Ahiagble (2004) maintains that indigenous weaving has its own handmade tools. These are made by the weavers themselves or by specialists in making weaving equipment who are not weavers themselves. The weaving tools, including the loom, are mostly constructed from wood or bamboo. For example, the bobbins are simple bamboo sticks with holes drilled in them. Looms are usually constructed by carpenters, sometimes, with guidance from the weaver.

With reference to the above literature, not only are bobbins made of bamboo but also from empty BIG pen holders and other such container sticks with holes drilled in them.

One of the most important parts of the loom is the beater or reed. The size of the beater determines the width of the cloth, with narrower beaters being more traditional. The beater is rectangular in shape, built of two fine strips of bamboo with holes cut at each end, joined by reeds.

The broadloom has a wider reed or beater as compared to traditional looms. The reed has sizes written in counts and are called as such. The counts include: 30s" reed, 20s" reed, 18s" reed and others. What this means is that, for every 1" measure taken on any named count reed, the number of dents will be equal to the size of the reed. Therefore, the smaller the reed number, the wider the dents spread within an inch of the reed and vice versa.

The heddle is also rectangular, consisting of two strong sticks joined by fine strings. To construct the heddle, the two sticks are held apart with bent pieces of wood and the whole is put into a frame of very flexible wood, the heddle making frame. Then the threads are wound between the two separated sticks in such a way as to make a loop in the middle of the threads. The warp ends passes through these loops (Ahiagble, 2004).

Confirming Ahiagble's statement that weaving apparatus is hand made by the weavers themselves or by others who have specialized in equipment making, www.google.com-Midwest Global Group, Inc. (2009) names a set of weaving apparatus in Twi as follows:

- the loom (*Kofi nsadua* "a Friday-born loom") which is constructed with wood;

- a set of two, four or six heddles *(asatia, asanan or asasia)* attached to treadles.
- pulleys *(awidle)* with spools *(donowa)* inserted in them;
- shuttles *(kurokurowa)* with bobbins *(awua)* inserted in them;
- beaters *(kyeree)*.

Other supporting equipment are skein winder *(fwirdie)* and bobbin winder *(dadabena)*, bobbins holder *(menkomena)* used for holding bobbins *(awua)* during warp-laying *(nhomatene)* and the heddle-making frame *(asakuntun or asadua).*

The researcher could not verify why these Twi names were given to the apparatus named above. These apparatus, like motifs in a cloth, have symbolic meanings and are accorded a great deal of respect.

The above literature is seen in the light of simplicity of the loom parts in terms of their construction. The systematic description of how some important parts of the loom such as the bobbin, reed and heddles are made locally would build the courage of teachers and students to be more innovative using these and other improvised accessories in the teaching and learning of weaving in schools.

2.4 **The Principles of Weaving**

Welford (1966), writing on the principle of plain weave and the development of weft supply during weaving, opines that the principle of plain weaving is very simple. One set of threads, which are intended to run in the length of the cloth, and which are known as the *warp*, are mounted on the frame so that another set, called the *weft*, can be passed across from side to side, or over and under certain of the warp threads in some definite order, the whole forming together a fairly solid fabric.

Inferring from Welford's idea of the plain weave, this structure is the simplest among all the fabric structures. It is a simple one up, one down alternating just like weaving a basket.

The passing of the weft thread was first done by hand, and it would soon occur to the weaver that his work would be made easier if he had a continuous supply of thread suitably wound around a piece of wood which could unwind as he went along. From this idea developed the bobbin, and eventually, when weaving became mechanical, the shuttle to contain the bobbin. The inventive weaver would then devise some means of parting the warp threads in some regular order, so that the weft could be passed across under and over alternate warp threads. This would take the form of lifting every alternate warp thread and depressing others.

According to Marjory (1966), woven fabrics consist of sets of yarns interlaced at right angles in some established sequence or pattern. The yarns that run parallel to the selvedge or the longer diameter of a bolt of fabric are called *warp yarns* or *ends*; those that run crosswise of the fabric are called *filling yarns*, *weft yarns*, *woof yarns*, or *picks*. The terms *warp* and *filling* are commonly used by retailers and consumers, whereas manufacturers and converters usually use the terms *ends* and *picks*.

Lord and Mohamed (1992) further state that woven fabrics are produced by interlacing *warp* and *filling* (weft) yarns. The warp lies along the length of the fabric whereas the filling lies across the width. Every warp yarn is separated from all the others; thus, the warp consists of a multitude of separate yarns fed to the weaving apparatus. On the other hand, the filling yarn is usually laid into the fabric, one length at a time. This shows that there a variety of ways of interlacing the two sets of yarns and the manner in which this is done determines the fabric structure. The yarn

character and the fabric structure together determine the properties of the fabric, such as appearance, handle and wear capability.

Yarn Requirements

Generally, the warp yarns undergo greater stress than the filling yarns during weaving; consequently, the yarn requirements for the two purposes are different. Warp yarns must be of a certain minimum strength, whereas the filling can be quite weak; the warp yarns usually have a relatively high twist but twist in the filling yarns is usually kept as low as possible. As twist costs money and excessive twist produces harsh fabrics, it is generally kept as low as possible in both types of yarn (Lord and Mohamed, 1992).

As a warp consists of a multitude of separate yarns or ends, in making an appropriate package (also known as a beam), the ends must lie parallel and this determines the type of yarn package that must be used. On the other hand, filling yarn needs to be continuous and the filling yarn package is wound according to the type of weaving apparatus used.

The Use of Adhesives

Adhesives may be used in achieving the minimum strength requirements of the warp yarns. The process of weaving involves the abrasion of one warp end against its neighbour and against the adjacent machine parts. The use of adhesives and lubricants can limit the amount of damage caused by this abrasion and it is the normal practice to treat warp yarns with a solution which serves both as adhesive and lubricant. This process known as slashing or sizing, is generally regarded as part of yarn preparation.

A critical look on how weaving is done on the broadloom shows that the warp yarns receives stress during shedding mechanism, beaming and most especially during beat-up.

The order involved in raising and lowering harness is responsible for the weave pattern developed. The *shuttle* carries the yarn across the shed and places the crosswise yarn into preliminary position. The reed is parallel to the harness and is responsible for packing the *pick* or *filling* yarn into position against the previous placed pick yarn. The *cloth beam* or *cloth roll*, located at the front of the loom, holds the completed fabric.

The basic weaving operation consists of four steps regardless of the kind of loom, its technological state, or the pattern to be woven:

- **Shedding** is the raising and lowering of the warp ends by means of the headless and harness to form the shed, the opening between the warp yarns through which the filling yarn can be passed.
- **Picking** is the actual procedure of placing the filling or pick yarn into the shed.
- **Battening**, sometimes called *beating*, *beating in*, or *beating-up* consist in evenly packing the filling yarns into position against the yarns previously placed.
- **Taking up** and **letting-off** involves taking up the newly formed fabric on to the cloth beam and letting off or releasing yarn from the warp beam. The operation maintains uniform tension from harness to shed to cloth.

From the above statement on harness, the structure of the fabric determines the number of harnesses to be used. To make a simple plain weave fabric, only two harness are required; for twill weaves, three or more harness are used; and for satin or sateen weaves, five or more harness are needed. Dobby patterns involve as many

as 32 harnesses; the jacquard attachment provides individual control for each warp yarn.

Wynne (1997) further explained the primary and secondary motions of weaving. According to her, every loom requires three primary motions to produce woven fabric: *shedding*, *weft insertion* and *beating-up*.

Primary motions

Shedding is the name given to the motion which moves the heddle frames up and down in order to separate the warp sheet into two layers and create a triangle in front of the reed (referred to as the 'shed') through which the weft can be passed.

Weft insertion (originally referred to as picking) is the means by which the weft is projected through the shed. This was traditionally done by shuttle, but more recently it is done by projectile, rapier, air jet or water jet.

Beating-up is where the reed, mounted in a reciprocating sley, pushes the weft into the fell of the cloth to form fabric. This requires considerable force, hence the term beating-up.

Secondary motions

There are two secondary motions in weaving: *let-off* and *take-up*.

Secondary motions are also critical in allowing weaving to take place and in controlling the quality of the final fabric being produced. The let-off motion ensures that the warp ends are controlled at the optimum tension for fabric that is being woven. The cloth take-up motion withdraws cloth from the fell and then stores it at the front of the loom.

Yarn property as reviewed in the above literature is very important to textile students. Since the raw material for weaving is yarn, students should have adequate knowledge on yarn property. This knowledge will help students to identify which type of yarn in terms of strength should form the warp and which should form the weft. This to a large extent will reduce the frustrations associated with weaving.

Knowledge on how to prepare warp yarns for them to withstand the cyclic tension motion in weaving is vital to avoid unnecessary breakages of warp yarns. Weaving cannot take place without laying a warp. The idea of how to lay a warp is therefore important to students.

2.5 **Broadloom Weaving Processes**

2.5.1 **Designing**

Three factors come into play in order to achieve a well constructed woven fabric. They are: the design, the draft and the peg plan / tie-up.

Akwaboa (1994) maintains that the most important and fundamental part of textiles is designing, which cuts across and other such as painting, weaving, embroidery and batik. Sackey (2002) maintains that the fundamentals of any woven design are the weave that shows how the warp and weft yarns have been interlaced. This creates a yarn intersection in which the warp runs above the weft and the weft, above the warp.

Akwaboa maintains that before weaving, the structure of the weaves should be designed on a special point paper (graph sheet) before they are woven on the loom. Sackey is of the view that the point paper is a special paper divided by vertical and horizontal lines which create squares between them. By this, the space between the vertical lines is assumed to represent a warp yarn whereas the space between the

horizontal lines represents the weft yarn. Their intersection then represents the weave. The point paper is used when plotting weave designs, but it is also possible to improvise this paper structure by ruling vertical and horizontal lines which create squares between them on a plain sheet of paper.

For easy visibility and to show the weave structure, the intersection of warp and weft which form the weave is shaded with colour pencil or any media that gives colour.

Making A Card Loom

In the classroom, a simple plain weave can be designed and woven on the card loom using a pair of scissors, a stiff cardboard, a comb, a coloured yarn for weft and a strong yarn for warp. Cut the cardboard into a rectangle of an A4 size. At each end of the shorter pair of sides, draw a line of dots of about one centimetre apart. The lines must be about one centimetre from the edges of the card. Punch holes in all the spots or make notches (v-shapes) with scissors. Pass the warp yarns in parallel formation through the notches, making them slightly taut and fastening the ends to the sides of the card loom. Select a coloured weft yarn and ply it to make it appear thicker than the warp ends. Start weaving by interlacing the weft in order of one up, one down through the warp. On reaching the last warp end, encircle it with the weft and return to the starting point by alternating the interlacing.

Drafting

Akwaboa (1994) explains that a draft is the order in which the warp ends are led to pass through the eyelets of the healds and the number of healds used for a design. Form his explanation, as in connection to broadloom, it can be deduced that

the more healds that are used, the broader the resultant fabric. On the loom, drafting is done with a loom accessory called the heddling hook.

Akwaboa further describes peg plan as the selection of healds to be raised or lowered to create a shed. In a two shaft broadloom, heddle frame one (1) should be tied to treadle (1) and frame two (2) to treadle (2) to give plain weave when raised or lowered during weaving. In a four shaft broadloom, a plain weave is achieved when shafts (1) and (3) is tied to treadle one (1) and (2) and (4) to treadle (2).

2.5.2 **Warping**

Akwaboa (1994) maintains that warping is the way by which many long yarns are put together to form the yarns that run lengthwise in the woven fabric. These yarns also run parallel to the selvedge of the cloth. Warping is done on the warping mill or the warping board.

Describing the warping mill, Sackey (2002) maintains that it is an apparatus that is made up of a skeleton roller that revolves freely on a metal rod fitted into a socket in the base. It consists of four uprights and two cross-pieces of wood, one of which is fitted with three pegs where the crosses are made during warping and the other with one peg where warping starts. Akwaboa (1994) also describes the warping mill as a wooden frame that consists of four upright posts that is mounted on a metal rod which runs freely in a socket at the base of the mill.

The use of the warping mill as explained by Akwaboa (1994), is one way of preparing a warp. There is yet another method which does not involve the use of the warping mill. It is the traditional method where warping is done on pegs nailed to the

ground. The only disadvantage here is that the weaver does not stand still and turn the mill forwards and backwards as in the case of using the warping mill but rather walk to and fro the starting point and where the crosses are made. Consequently, leading to waste of time.

Before warping begins, and in order to produce a design, the cloth particulars of the design for both warp and weft should be indicated in a jotter. They include: the type of weave, the colour of yarns to be used, reed used, the total number of warp yarns and the plies used for the weft.

During warping, the weaver is stationary while the mill turns forwards and backwards. In order to cater for different lengths of warp, the four upright posts are bored with series of small holes from the top to the bottom so that the cross bars carrying the pegs can be fixed at any height desired depending on the length of the warp to be made.

Warping Length

On warping length, Akwaboa (1994) opines that if a length of warp, say six meters is needed, a strand that is longer than the required length is measured up to 7½ meters. The extra 1½ meters is necessary to cater for shrinkage, tying and wastage since in practical terms, the actual weaving cannot reach the very end of the warp. A thread measuring this length and used as a guide is wound on the warp before the actual warping begins. The yarns to be used for warping, if in hanks, are put on a weaving accessory called the skein winder and if in cones or bobbins, are fixed on an accessory called the spool rack. Two hanks or bobbins are fixed to get 2-strands called ply yarn for warping. When warping, Sackey (2002) maintains that, the warp yarn should be guided by one of the weaver's hands while the other hand

turns the warping mill in both clockwise and anticlockwise directions with the weaver remaining stationery. When the total number of warp ends has been obtained, the crosses should be properly secured before the warp is removed from the warping mill. This is done by passing a strand or string through the openings by the pegs and tying the ends of the strand to avoid slippage. The warp is then removed with care beginning from where warping started in a form of a chain stitch.

2.5.3 **Raddling**

Akwaboa (1994) describes raddling as the spreading of the bulk warp evenly across the warp beam with the help of a raddle. A raddle or spreader is one of the weaving accessories that is either made of wood or metal appearing just like a comb with a removable top cover.

Before raddling, the loom that has tie-up already made is disconnected to allow free passage of the warp to the raddle. The removable top cover of the raddle is removed after which the raddle is tied to the sley. The bulk warp is then spread evenly across the warp beam according to the cloth width to be woven. The raddle has dents that are wider than the reed. It counts two dents per inch raddle, three dents per inch raddle, etc. When spreading the warp, each dent of the raddle should take even number of warp ends. For instance, if two dents per inch raddle is to be used along side 20 inch reed when weaving a cloth of 20 inches in width, then, because the raddle has two dents per inch, 10 warp ends should be put in each of the dents of the raddle. After spreading, it should be noted that 40 dents in total will be occupied by the warp ends to get the required width of the cloth. After raddling, the top cover

of the raddle is fixed to it. The warp is then stretched taut and tensioned with tension or beaming box before it is wound onto the warp beam.

2.5.4 **Beaming**

Beaming is the process whereby the long warp is stretched taut and wound onto the warp beam on the loom.

Akwaboa (1994) maintains that there are two methods of beaming: beaming that involves two or three people. According to him, one or two people will pull the warp taut whilst the other person frees the warp from any entanglement and at the same time winds it onto the warp beam. The second method of beaming is by using the tension or beaming box. In this process, tension of the warp is replaced by a heavy cement block put in a wooden box and the warp tied to it while one person frees the warp from entanglement and does the winding as well.

2.5.5 **Heddling**

The process of passing the individual warp ends through the eye or loop of the heddles or healds with a heddling or threading hook is termed heddling. Anni (1974) commenting on the historical development of the heddle, maintains that before the introduction of the heddle, the warp threads to be interlaced had to be lifted up with the fingers so that the weft threads could be inserted. After each intersection, the warps next to be interwoven had to be selected anew, shifting from odd to even numbered threads or vice versa. This manner, according to Anni, allows only small groups of warp threads to be lifted, just enough as a hand can easily hold. This

method of creating shed in the warp for the passage of the shuttle carrying the weft made weaving extremely difficult and tedious especially when the width of the cloth to be woven is big. The introduction of the rod which was placed permanently under the threads to be lifted simplified the work a bit since the thickness of the rod caused a separation of the warps to be raised from those to remain lowered. A counter shed was made possible by attaching the warps lying under the shed-rod by means of strings forming loose loops around each of them to a second rod lying on top of the warp.

Akwaboa (1994) maintains that the healds are suspended by the heddle frames on the loom. The passing of the warps through the eyes of the heddle or healds must follow a heddling order in order to produce the required design. On a broadloom with four shafts or heddle frames, a plain weave structure is achieved with 1, 2, 3, 4 heddling order. When heddling with this heddling order, the first warp yarn goes through the eye of the first heald on the first heddle frame, the second warp yarn goes through the eye of the first heald on the second heddle frame, the third warp yarn goes through the eye of the first heald on the fourth heddle frame. This order is repeated till all the warp yarns are heddled. In a two shaft broadloom, 1, 2, heddling order gives a plain weave structure and the heddling process is the same as the first two above when repeated.

Heddling becomes easier and time saving when it is done by two people; one in front of the loom and the order behind the loom. The yarn to be heddled is picked by the one behind the loom who hooks it in the heddling hook that has been passed through the eye of the heald by the one in front of the loom. The one in front of the loom then draws the yarn through the eye of the heald towards the front part. (Akwaboa, 1994).

Heddling should be systematic and must be done with great care. Errors committed during heddling will result to a weave fault in the weave structure. From time to time, the heddled yarns in front of the loom should be tied together with a loose knot to prevent them from removing from the eyes of the healds.

2.5.6 **Reeding**

The individual warp ends, after heddling, are led pass the dents of the reed using the reed hook. This process is known as reeding. The reed is rectangular in shape and is either made of raffia or metal. At the shorter side of the rectangular metal reed is written the “count” of the reed. The count includes 18s, 20s, 30s, etc. An 18s reed means in every one (1 inch) measurement taken on the reed, 18 dents can be counted. Also a 30s reed means 30 dents spread in every one (1 inch) measurement taken on the reed. Most raffia reeds do not have their counts written on them. To know the count of such reeds is to count the number of dents within one inch taken on the reed.

Akwaboa (1994) commenting on fixing the reed on the loom and reeding maintains that the reed is made stable by fixing it in the sley and tieing it before reeding. Each heddled warp yarn is threaded through each dent using the reed hook.

The warp yarns are safe from getting out of the reed when a number of them, in the process of reeding, are tied with a loose knot in front of the reed.

2.5.7 **Tie-up**

Before actual weaving, two tie-ups go on in the broad or foot power loom. They are:

1. Tying the warp to the apron stick or fly rod of the cloth roller and
2. Tying of the treadles and lams to the heddle frames to facilitate correct opening of the shed for weaving. It is when the heddle frames have been levelled with the castle before this tie-up begins.

Sackey (2002) is of the view that tying-up of the treadles forms the final turning-up of the broadloom and it involves the horses, the heddle frames, the lams and the treadles. He further explained that there are two pair of horses on the loom. The inner ends of the first horses should be connected to the first harness or heddle frame, and the outer ends to the second harness. The inner ends of the second set of horses should be connected to the third heddle frame and their outer ends to the fourth heddle frame. The horses as well as the four harnesses or heddle frames must be on one level at where they are located before and after the tie-up. Next is to connect the heddle frames to the lams. The first lam is tied to the first heddle frame; the second lam to the second heddle frame; the third lam to the third heddle frame and finally, the fourth lam to the fourth heddle frame. There are corresponding holes in the lams where these tying are done. The four lams are finally tied to the six treadles for twill weave and to two treadles for plain weave (Sackey, 2002).

When all the tie-ups above are done very well, the shed opens very well when a treadle is depressed which consequently facilitate easy passage of the shuttle that carries the weft.

Akwaboa (1994) maintains that tie-up is the tying of the treadles and lams to the heddle to facilitate proper shed opening. The cord to be used for the tie-up should be

strong with a switch or a non-slip knot made for the tie-up. It is equally important to note that the tie-up cords should be of equal length if proper opening of the shed is to be achieved and tie-up must also follow the tie-up draft or peg plan as shown on the point paper with crosses and circles at the design state. Sackey in his explanation of the tie-up made use of the word “harnesses” whilst Akwaboa replaced Sackey’s world with “heddle frames”. Both words mean the same and are used interchangeably by other textile writers.

The tying of the warp to the apron stick of the cloth roller or the flying rod is done by drawing a section of the warp and dividing it into two halves before it is tied together with a bow knot to the apron stick (Akwaboa, 1994). It is important to ensure that even tension is achieved across the entire sheet of the warp during tying.

2.5.8 **Weft preparation**

Sackey (2002) maintains that the weft is unwound from a bobbin that is fixed in a shuttle during weft insertion or picking. To prepare a weft, the weaver needs a skein winder (skeiner) and a bobbin winder which are accessories for weft preparation.

Akwaboa (1994) is of the view that during weft preparation, the package of the yarn (hanks and cheeses) are fixed on a skein winder and spool rack respectively and wound unto the bobbin with the bobbin winder. The design to be produced and the thickness of the fabric are factors to consider when plying the weft yarn. A thick fabric will require an increase in the number of plies. Weft that requires two or four ply yarns will also require two or four hanks or cheeses fixed on the skein winder or spool rack respectively, all drawn and wound onto the bobbin.

As explained by Akwaboa, yarns for weaving and for that matter for weft preparation come in different packages which include: hanks, cheeses, cakes and cones. These packages to a large extent require either spool rack or skein winder for weft preparation. For instance, a hank unwinds during weft preparation when it is fixed on a skein winder. Its package is therefore unfit on the spool rack.

2.5.9 **Weaving**

On weaving, Sackey (2002) maintains that three motions are involved: shedding, picking and beating-up. He further explained each of the motions. Shedding – pressing of the treadles to open shed; picking – insertion of the weft on a bobbin fixed in the shuttle; beating-up – pushing of the weft to the fell of the fabric.

Akwaboa (1994), commenting on the three motions in weaving, share the same idea with Sackey. He said a treadle is first depressed to open a shed after which a shuttle containing the weft is led pass through the shed from one side of the loom to the other side. Finally, the reed is used to push the weft close together to produce a compact cloth or fabric. As a beginner, the weaving process is very slow as a treadle is depressed to create a shed, pick with the shuttle and finally beating-up. However, constant practice, in time makes you a fast and experienced weaver.

2.6 **Principles of Teaching and Learning**

Teaching is thought of as the establishment of a situation where it is believed that effective learning will take place (http:/www. honolulu.hawaii.edu/intranet).

Teaching is the organization of learning to achieve authentic results. This can be realized when teaching becomes successful.

The use of teaching and learning materials in delivery of lessons in the classroom is of vital importance to helping students to grasp the content of what has been taught.

Inferring from the above, before effective teaching and learning can take place, there must be:

1. Learner or group of learners
2. Facilities for learning
3. Orderly and understood procedure for presentation
4. A way of grading for both the teacher and the learner to know how well the learning is going
5. A teacher to organize the above into a whole

   (http:/www. honolulu.hawaii.edu/intranet).

It is obvious, however, that learning can take place without a teacher as an instructor. On principles of teaching, Pastore (2002) explains Edgar Dale's teaching and learning as involving concrete and abstract methods. He summarized his findings in a pyramid which he calls Dale's Cone of Experience. The cone device is a visual metaphor of learning experiences, in which the various types of audio – visual materials are arranged in the order of increasing abstractness as one proceeds from direct experience. On the cone, he concluded that people remember 10% of what they read, 20% of what they hear, 30% of what they see, 50% of what they see and hear, 70% of what they write and say and 90% of what they say as they do (http:/rapidbi.com).

Dale's Cone of Experience indicates that teaching will be successful and learning will be authentic when audio – visual materials are used in the teaching process. The successful percentage spring from when learners see and hear, write and say, and say as they do during the teaching and learning process.

Barbara (1993) is of the view that when preparing to teach a large lecture courses one can follow these four general strategies.

1. **Become Comfortable With The Material**

   The teacher must read on the topic to be treated and try to anticipate questions that students might ask. The course material and assignments must be reviewed with colleagues who have taught the course before.

2. **Don't Plan To Lecture for a Full Period**.

   The attention span of children is between ten and twenty minutes. After that, students have difficulty concentrating on the speaker. To relieve monotony and recapture students' interest, Barbara explains that for every lecture, the teacher must change his/her pace very fifteen minutes.

3. **Be Clear About What Can Reasonably Be Accomplished By Lecturing**

   Though lecturing is effective as other instructional methods, it is less effective in promoting independent thought or developing students' thinking skills. As a teacher presents facts, he/she should try to share complex intellectual and analyses, clarify controversial issues and compare and contrast different points of view.

4. **Budget Your Own Time Carefully.**

   It takes a great deal of time to teach a large class. The teacher must therefore set up weekly work schedules for himself in order to prepare for the onslaught of midterms and finals. The teacher should find ways to scale back other

obligations, if he can, in order to make time to deal with complexities of teaching.

The Theory of Multiple Intelligences

Practical weaving on the broadloom requires that knowledge acquired is put into action through muscular movement. In his literature, Gardner (1983) explained the various forms of multiple intelligences which are available to cognition (process of thought). This intelligence promotes the need to teach to various learning modalities in a school set up. He explained that a child who masters multiplication easily is not necessarily more intelligent overall than a child who is stronger in another kind of intelligence. Gardner has articulated eight basic types of intelligence including Bodily-Kinaesthetic which this project seeks to teach. According to him, the core elements of the bodily-kinaesthetic intelligence are control of one's bodily motions and capacity to handle objects skilfully. Gardner elaborates to say that this intelligence also includes a sense of timing, a clear sense of the goal of a physical action, along with the ability to train responses so they become like reflexes.

In theory, people who have bodily-kinaesthetic intelligence should learn better by involving muscular movement (e.g. getting up and moving around into the learning experience). They may enjoy acting or performing, and in general they are good at building and making things. They often learn best by doing something physically rather than reading or hearing about it.

In conclusion, weaving as a craft is incorporated with a lot of creative skills which is an important key in solving the nation’s problems. Man needs to cover his nakedness with nothing but cloth, which is a woven product. This

craft will only sustain when the act of doing it is transmitted from one generation to another. This is exactly what the researcher sought to do in order to ensure that textiles students learn the skill of weaving and practice it when they complete school.

There are a lot of literature on weaving as well as the accessories and looms for weaving from books written by scholars and on the internet which the researcher combed and discussed in his literature review. However, of all the literature reviewed, the researcher could hardly find literature on video documentary on broadloom weaving which this project seeks to do.

CHAPTER THREE

METHODOLOGY

3.0 **Overview**

This chapter explains the research design used in the study. The methods of research, the population for the study, the sampling technique and the data collection instruments are all explained.

According to Wikipedia, the free encyclopaedia (2007), methodology is defined as a body of methods, rules and postulates employed by a discipline, a particular procedure or set of procedures, or the analysis of the principles or procedures of enquiry. In any activity that requires concrete results, a well-defined and systematic methodology for achieving those results is extremely important.

3.1 **Research design**

In general, a research may be qualitative or quantitative in nature. Qualitative research approach is used in this study. Frankel and Wallen (1996) assert that qualitative research investigates the quality of relationships, activities, situations, or materials. According to them, in qualitative research, there is greater emphasis on holistic description, thus describing in detail all of what goes on in a particular activity or situation rather than on comparing the effects of a particular treatment as in experimental research.

Best (1981) opines that qualitative research study is the type in which the description of observation is not ordinarily expressed in quantitative terms. This does not mean that numerical measures are never used in qualitative research, but it is not largely dependent on numbers.

Qualitative research approach often has the aim of description and the researcher may follow-up with examinations of why the observations exist and what the implications of the findings are. Leedy (2005) asserts that qualitative research often has the aim of description, interpretation, verification and evaluation of situations, settings, processes, relationships, systems, or people. These characteristics make qualitative research approach ideal for this research that aims at describing and interpreting data and video documenting broadloom weaving processes for effective teaching of fabric weaving in Senior High Schools. Based on qualitative research approach, descriptive and action research methods were used.

3.2 **Descriptive research method**

This research method involves observation, recording, description, analysing and interpretation of conditions as they exist. It describes what is being researched and its major purpose is to tell or describe a situation in detail.

This thesis was not devoid of observation, recording, description, analysing and interpretation of conditions which played a major role in gathering the required data and putting it into a meaningful piece of report. The researcher, in this process, described comprehensively and systematically the weaving accessories and broadloom weaving processes for better understanding and to practically orient teachers and students to effective teaching and learning of fabric weaving.

3.3 **Action research**

Action research is regarded as research that is normally carried out by practitioners (persons that stand in the field of work). It enables the researcher to investigate a specific problem that exists in practice. Landman (1988) opines that the

researcher should be involved in the actions that take place. A further refinement of this type of research is that the results obtained from the research should be relevant to the practice. In other words it should be applicable immediately. This means that the researcher, as expert, and the person standing in the practice (learner), jointly decide on the formulation of research procedures, allowing the problem to be solved (Jacobs *et al*, 1992).

Action research is characterized according to (Jacobs *et al*, 1992) by the following four features:

- ❖ Problem-aimed research focuses on a special situation in practice. Seen in research context, action research is aimed at a specific problem recognizable in practice, and of which the outcome problem solving) is immediately applicable in practice.
- ❖ Collective participation. A second characteristic is that all participants (for instance the researchers and persons standing in the practice) form an integral part of action research with the exclusive aim to assist in solving the identified problem.
- ❖ Type of empirical research. Thirdly, action research is characterized as a means to change the practice while the research is going on.
- ❖ Outcome of research cannot be generalized. Lastly, action research is characterized by the fact that problem solving, seen as renewed corrective actions, can not be generalized, because it should comply with the criteria set for scientific character.

The researcher visited some Senior High Schools for observation and saw that the practice of fabric weaving on the broadloom has been either neglected or not received the needed attention. In order to solve this problem, a Video Compaq Disc

that shows clearly all the weaving processes has been video taped by the researcher for use by teachers and students as an instructional media.

On the field, the researcher, being an instructor, and his learners tested the Video Compaq Disc in the classroom to see its effectiveness in teaching and learning process. This exercise, which lasted for two months took place at Abetifi Presbyterian Senior School in two separate classes (SHS 2 and 3). The researcher scheduled his time to suit the textile periods on the school's time table and the learners as well.

With guidance from the instructor, students watched the documentary, lesson by lesson as they put to practice what they watched. Where difficulties arise, the researcher either played back the documentary for students to watch again before they put the action to practice or helped them to carry out that part of the weaving process.

3.4 **Library research**

The researcher visited and gathered data from the following libraries for the research.

- KNUST Libraries, Kumasi.
- University of Education Libraries, Winneba.
- Presbyterian University College, Abetifi.
- Presbyterian College of Education, Abetifi.

3.5 **Weaving studio research**

The following weaving studios and centres were visited to observe and collect primary or firsthand data on the weaving processes in order to support and make a comparison.

- K N U S T Textile Weaving Studio.
- A broadloom weaver at Ayigya, Kumasi.
- A broadloom weaver at Atibie - Kwahu.

3.6 **Other Sources of Data**

The researcher combed the internet to retrieve current information that relate to the research. In addition to the internet, primary data or first-hand information were solicited from Maa Lizy and Mr. Asante who are both broadloom weavers at Atibie – Kwahu and Ayigya in Kumasi respectively.

3.7 **Population for the Study**

Population, as explained by Busha and Harter (1980), is any set of persons or objects that possess at least one common characteristic. Population as defined by Sidhu (1984) is the complete set of individuals, objects or events having common observable characteristics in which the researcher is interested. It may also refer to as the aggregate of the totality of objects or individuals regarding which inferences are made in a sampling study. This implies that population does not necessarily refer to people but may also refer to objects. It may be finite if its members can presumably be counted or infinite if its members cannot be definitely known.

In any research, two kinds of population are dealt with; target population and accessible population. Fraenkel and Wallen (1993) explain that target or actual population is the one in which a researcher would really like to generalize the results of his study. This is rarely available. The available population to which a researcher is able to generalize the results is the accessible population; the former being one's ideal choice and the latter, one's realistic choice.

The population for this study was made up of public and private Senior High Schools offering textiles in East Akim and Kwahu East Districts. This population comprised teachers, students and broadloom weavers.

3.8 **Accessible Population**

For the purpose of this study, the accessible population has been grouped into three categories as follows:

(a) Students pursuing textiles in some selected public and private Senior High Schools in the above mentioned districts. Thus;

- Ofori Panin Senior High, Kukurantumi - 15 respondents from each class of SHS 2 and 3
- Christian Heritage Senior High and Technical, Kukurantumi - 15 respondents from each class of SHS 2 and 3
- IPS Senior High and Technical, Kukurantumi - 15 respondents from each class of SHS 2 and 3
- Presbyterian Senior High, Abetifi - 15 respondents from each class of SHS 2 and 3

(b) Teachers who teach textiles in the above mentioned Senior High Schools - 4 respondents

(c) Broadloom weavers – two respondents.

The total potential or accessible population studied in this research was 126 respondents.

3.9 **Sampling technique**

The probability to study a whole population in order to arrive at generalizations and conclusions is less and impracticable. Population for a particular study may be so large that its characteristics will be difficult to measure. In such cases, before the measurement is completed, the population might have changed (Best, 1981). For this reason sampling becomes imperative in research to select appropriate or sizeable sample from the parent population to be studied.

Quartey and Awonyo (2002) postulate that sample is a subset of the population and it consists of individuals, objects or events that form the population. It is a selected group which is fair and an adequate representation of the entire population of interest. Quartey and Awonyo share a similar view with Best who states that the use of sampling technique in research is very important in that when the population is very large, it cannot be satisfactorily covered. Also when the data is unlimited, the use of sampling technique is very helpful. However, when the number of individuals to be studied is manageable, intensive studies become possible. Sampling may be simple random, stratified random, purposive or cluster. Out of the types of sampling, the researcher employed the use of Purposive and Simple Random Sampling techniques.

In all, 40% respondents were selected from the accessible population for the study. Cohen and Manion (1980) establish that for quality research, 30% of the population for the study is a fair representation for an acceptable accuracy of results. However, since the potential or accessible population for the study is 126, 40% was selected for the study, representing 50 respondents.

3.9.1 **Purposive Sampling**

Leedy and Ormrod (2005) postulate that, in purposive sampling, people or units are chosen for a particular purpose. This source explains that, more often, qualitative researchers are intentionally non-random in their selection of data sources. Their sampling is purposeful to select those individuals or objects that will yield the most information about the topic under investigation. Frankel and Wallen (1993) add that, based on previous knowledge of a population and the specific purpose of the research, investigators use personal judgement to select a sample that will yield accurate results.

Because this research is focused on specific field of study in the Senior High Schools, thus, weaving, purposive sampling was used to select specific and resourceful respondents from the selected Senior High Schools for the study. Purposive sampling was used to select textiles teachers and broadloom weavers because they are the experts who can provide factual data on broadloom weaving processes.

3.9.2 **Simple Random Sampling**

Leedy and Ormrod (2005), Borg (1997), and Fraenkel and Wallen (1993) agree that simple random sampling is the one in which each and every member of the population has an equal and independent chance of being selected. Borg (1997) explains that by "independent" implies that the selection of one individual does not affect in any way the selection of any other individual. This means that each member of the population is given an equal chance of being picked and makes it possible to randomly select people or objects with similar characteristics from a parent population to be studied. Sampling of this sort was important in the research to select

students to be interviewed without any biases. The respondents (8-girls and 7-boys, aged between 15-18) of the accessible population from the various Senior High Schools were randomly sampled and interviewed on practical fabric weaving on the broadloom as carried out in their schools.

3.10 **Data Collection Instruments**

Interview and observation were used in this study for data collection.

3.10.1 **Interview**

Interviews were conducted in this research to collect relevant data from textile teachers, students and local broadloom weavers. The use of interview was significant in the study because it made it possible to get immediate responses from the respondents. Moreover, it helped the researcher to collect data from a 25 year old lady and 40 year old gentleman local broadloom weavers with little or no formal education and for that matter cannot respond to questionnaire.

Adgedu et al (1999) explain that interview is a face to face meeting between a questioner and a respondent. It is an oral questionnaire which is often used in collecting data for descriptive studies and action research. Interview according to this source is superior to other data collecting devices in the sense that response rate is high and issues can be clarified. Moreover, immediate responses can be obtained because respondents are usually willing to talk than to write.

An interview is a conversation between two or more people; the interviewer and the interviewee, where questions are asked by the interviewer to obtain information from the interviewee. In research, interview refers to a structured social interaction between a researcher and a subject who is identified as a potential source

of information, in which the interviewer initiates and controls the exchange to obtain quantifiable and comparable information relevant to an emerging or previously stated research questions. Interviews can be divided into two types, interviews of assessment and interviews for information. Interview of assessment is the most common type used for assessment in a job which is carried out between an employer and an applicant. The goal of such an interview is to assess potential employee to see if he or she has skills and intelligence suitable for the workplace. Information interview on the other hand is the type that seeks to gather information about a subject. This type of interview is mostly applied by most researchers in different field of academia (http://en.wikipedia.org).

The developed interview guide for textile students and teachers (see Appendix A and B) was used by the researcher to collect data from textiles students and teachers in the four selected Senior High Schools. The researcher spent one week in each of the schools he visited to gather his data. In each of the schools, and with the interview guide, the researcher first interviewed the textiles teachers by asking them questions as in Appendix B. The responses from all the questions were audio taped and handwritten where necessary. At Abetifi Presby Senior High where the researcher teaches, the teacher who was teaching textile before the researcher was posted to the school was interviewed. The researcher did this because it would be practically impossible for him to answer questions set by himself. Students on the other hand were selected for interview with simple random sampling technique. In each class, eight girls and seven boys were selected to answer questions on weaving as appeared in their interviewed guide (see Appendix A). In the same way, their answers were audio taped and handwritten where necessary. It should be noted here

that this whole exercise was done with assistance from Asamoah Tei who recorded by writing answers given by interviewees.

3.10.2 **Observation**

Observation is regarded as the most direct means of studying people when one is interested in the overt behaviour. Observation is a natural way of gathering data for research. Data collected through observation may often be more real and true than data collected by any other method. Actual characteristics of subjects observed give true and accurate answers to questions that may be asked.

Best (1981) is of the view that observation deals with gathering information through direct examination. He further adds that, observation has been a prevailing method of inquiry and continues to be a character of all research, be it experimental, descriptive or historical. Observation comes in two main forms: participant and non-participant observation. Participant observation is the observation of the behaviour of a person or a group by a researcher who plays an active role in the situation. The researcher actually participates or gets involved in the activities or events which he or she is investigating. Non-participant observation is the type of observation in which the investigator is not directly involved in the activities or situation being observed but sits directly on the sidelines and watches what goes on.

The researcher employed participant type of observation to collect primary data from textile teachers, students and local broadloom weavers. Observation was made with regards to how teachers teach fabric weaving and students' participation in class as well as the state of broadlooms and weaving accessories in the schools. The researcher also took photographs where necessary to aid the discussion.

In this study, the researcher spent one week in each of the sampled schools to observe Art Studios and galleries in these schools to find out where art works, including textiles, are made and how these works are preserved. He also observed the state of broadlooms and accessories used for fabric production. Finally, classroom observation on theory lessons in textiles were made to find out how teachers handle their lessons as well as the students' participation in class.

Data collected through interview, observation and field testing of the documentary have been assembled, synthesized, analyzed, interpreted, conclusions drawn and recommendations made in Chapter Four of this project.

3.11 **Validation of the Instruments**

The interview guide used by the researcher as data collecting instruments was validated through vetting or proof-reading to make them error-free before administering them. The proof-reading was done first by the researcher, colleagues and finally by the supervisor. (See Appendix A and B). Interviews were conducted to find out the following:

1. Whether Senior High schools offering textiles have broadlooms and their accessories.
2. Whether textile teachers are practically oriented to teach weaving on the broadloom.
3. Students' participation and interest during theory lessons on weaving and practical weaving on the broadloom.

3.12 **Administration of the Research Instruments**

Administration of the research instruments was done by the researcher and an assistant who assisted the researcher in recording voices of respondents. Since the study employs interview and observation, time and dates for the administration of the instrument were scheduled ahead of time and convenient enough to the respondents. With the help of textile teachers in the schools where interview and observation took place, the scheduled time and dates were communicated to students to enable them to prepare prior to the actual interview and the observation schedule. Interviews and observations were done during textile periods as appeared on the school time table.

3.13 **Data**

Two forms of data were employed in this study. They are: primary and secondary data.

3.13.1 **Primary data:** Primary data were collected through interview and observation from respondents of the accessible population.

3.13.2 **Secondary data:** Secondary data were solicited from books, encyclopaedia and journals from the library, internet and unpublished theses.

3.14 **Phases of The Project**

Chapter four of this thesis has been grouped under three phases to make easy understanding of the entire project.

Phase One: Interviews conducted and observations made at Local Broadloom Weaving Centres, Ofori Panin Senior High- Kukurantumi, Christian Heritage Senior

High and Technical- Kukurantumi, IPS Senior High and Technical- Kukurantumi and Presbyterian Senior High- Abetifi.

Phase Two: Video filming process and its content.

Phase Three: Using the video as a tool for teaching in the classroom as in action research.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF FINDINGS

4.0 Overview

This chapter explains how the data collected were assembled and how results from interviews conducted were discussed. Observations and interviews from respondents, the video making process as well as the field testing of the video documentary were analyzed and interpreted.

4.1 Analysis Plan

Results from data collected from interviews and observation were assembled and discussed first, followed by discussions on filming the video and field-testing of the documentary.

4.2 Main Findings

The main findings made by the researcher during his research have been assembled and considered under the following:

1. Results from interviews with teachers and discussions.
2. Results from interviews with students and discussions.
3. Results from observation in schools and classrooms.
4. Results from observation made at local broadloom weaving centres.
5. Results from filming the video.
6. Results from field testing of video documentary with students.

4.3 **Phase One: Interviews Conducted and Observations Made at Schools and Local Broadloom Weaving Centres.**

4.3.1 **Results From Interviews With Textile Teachers and Discussions**

The researcher did a comparative study in his research in order to generalize his findings. As stated in the population for the study, two public and two private Senior High Schools from East Akim and Kwahu East districts were selected as data collection centres for the research. The researcher, by his selection, sought to compare public and private schools performance with regards to practical weaving as carried out on the broadloom. In all, four teachers were interviewed.

A textiles teacher who is the Head of Department for Visual Arts in one of the public Senior High Schools said in an interview that he has been teaching textiles in the school for the past 10 years. According to him, resource persons in town were called for help in his early days in the school to teach practical weaving on both broadloom and traditional looms. He said the exercise stopped a very long time ago when the loom parts and accessories began to disappear one after the other. Observation made by the researcher in the store room where the discarded broadloom is kept revealed a true story told by the teacher. The heddle frames with healds, pulleys, horses, lams and some important parts of the broadloom were nowhere to be found. Not a single accessory of the loom could be traced in the room. When the researcher asked his plans to put the loom back to functioning, he said, he had no plans since his request on several occasions to the headmaster to release funds to purchase these accessories had proved futile and he cannot use his own money to buy them for the school.

The body responsible for setting Senior High School practical exams (West African Examinations Council) surprisingly dropped two weaving questions last year

(2009). One of the questions involves the use of the broadloom whilst the second question involves the use of the traditional loom. (See Appendix C)

These questions received a lot of criticism and agitation from some textiles teachers because it was the first time in the history of textile practicals since 1993, demanding that students be compelled to weave. Thus students do not have option to choose as it was happening in previous years (in most cases, one question from weaving and the next from other component of textiles – printing, dyeing, embroidery, appliqué, etc). After all criticisms, nothing changed in any of the questions, which pre-supposes that the examination body did that for a purpose. They might have noticed a trend where students were found avoiding practical weaving questions over the years; perhaps except some few students who are natives of or residing in weaving centres in Ghana. Asking how they managed to carry out the 2009 weaving project successfully, he refused to answer.

The story was not much different from interview and observation made in the second public school. The teacher who was teaching textiles before the researcher was posted to the school told similar story about the headmaster's refusal to help purchase accessories for the broadloom. The school has one broadloom which according her, was bought by the former headmaster who was a textiles graduate. The loom is in good shape but has no reed and warping mill for warp preparation. Its accessories were obsolete but were intact in the art gallery.

Teachers in the two private schools had similar stories to tell when they were interviewed. In one of the schools, the textiles teacher said he is a graduate of a Senior High School. According to him, he has been teaching textiles over the past two years in the school. Interview and observation revealed that the school has no

loom for weaving. The principal of the school was ready to buy both the traditional and broadlooms and accessories for the school but had no idea as to where he could get them. These two textiles teachers who teach in the private schools confessed that they cannot teach practical weaving even if the school manages to get looms and their accessories for the school. Asked whether they have undergone any in-service training in textiles, they said no.

4.3.2 **Results From Interviews With Textile Students and Discussions**

Interviews were conducted by the researcher and an assistant who helped in audio recording in all the four Senior High Schools. The interviews were conducted in all the schools before field-testing the video documentary. In each class of SHS 2 and 3, 15 students were randomly selected for the interview. All students interviewed said they had been taught the theory aspect of weaving in the classroom but without any practical activity. However, the field testing of the video documentary at Abetifi Presbyterian Senior High School gave the students the first ever time of viewing and partaking in all the weaving processes as carried out on the broadloom. Interviews conducted revealed that the only practical weaving students did after treating theory lessons on weaving was card loom weaving; the main variations being plain and twill weaves. About ninety percent of the students interviewed in the private schools said they have never seen the broadloom with their naked eyes before. They admitted, however that they have seen a picture of the broadloom in their textile pamphlets. The rest of the students said they had once seen people weaving in their various communities using broadloom.

Although students interviewed in private schools admitted that they had been taught all the theory of broadloom weaving, about 70% of those interviewed could hardly name the parts of the loom and their functions, accessories used and the systematic processes involved in broadloom weaving, more so to describe them.

In the first public school, the case was different. Ninety percent of the students interviewed could name and tell the functions of some parts of the broadloom, some accessories used and the systematic processes involved in broadloom weaving. Description of the processes became a bit difficult to some SHS2 students. The researcher noticed from interviews conducted that the performance of SHS 3 students was outstanding as compared to SHS 2 students. The difference in performance may be due to the fact that the SHS 3 students, according to the researcher's observation, had had treated more lessons on weaving than SHS 2 students.

In the public school where the researcher field-tested the video documentary, a different story was told by students prior to the testing. All students interviewed said they had seen the broadloom before in their school but had not used it before. They could not give answers to why they had never used it before, though it was in good shape. Students interviewed could name the following accessories of the broadloom which they had seen in the school: the shuttle, bobbin, raddle, bobbin winder, skein winder, spool rack and cones of yarns being the chief weaving material.

Observations made by the researcher revealed that some of the accessories that students mentioned, including bobbin winder and raddle were not in good shape for effective practical weaving.

85% of the students who were selected for interview could mention some parts of the loom and their functions. They could also name and tell all the weaving accessories available in the school and their function in the weaving process. Few of them especially those in SHS 3 could mention the systematic procedures (designing, warping, beaming and so on) involved in broadloom weaving and describe their processes.

4.3.3 **Results From Observations Made in Schools and Classrooms**

The two public schools where the researcher made his observations revealed that each of the schools has an art studio and gallery where works of students have been displayed. The researcher did not see such facility during his visit to the two private schools. In an attempt to find out why such facilities are absent in the schools, the researcher was referred to the headmaster of the schools. On where students keep their art works and have their practical works, textile teachers in the schools told the researcher that students do their practical works in the classroom where they learn. Their art works on the other hand have no place for display and so students take them home. Both private schools have no loom and its accompanying accessories. One public school has broadloom that has been discarded. Not a single accessory of that loom could be traced in the store room. The other public school where the researcher field tested his documentary has a broadloom that is in good shape. Accessories are available but some are not in good shape for practical weaving. The reed and the warping mill were completely absent in the school.

Classroom observation of lesson delivery on the theory of broadloom weaving by textiles teachers in one of the private schools shows that he does not

have much control over the subject he teaches. Personal interview with him revealed that he is a senior secondary school graduate. According to him, he studied textiles but never had the opportunity to weave on the broadloom. The other teacher in the other private school had similar problems in his lesson delivery. He is a Polytechnic graduate who studied fashion. The researcher, by his finding, can conclude that he is teaching a subject he had little idea about. Further observation made during classroom teaching show that students do not understand theory lessons on weaving.

Observations made in classroom teaching and personal interviews with textile teachers in the public schools show that teachers are graduates of the subject they teach. Students showed interest and contributed to weaving lesson by asking questions for clarification. According to them, lacks of teaching aids are their major problem in their schools.

4.3.4 **Results From Observation made At Local Broadloom Weaving Centres**

The researcher made several visits to a local broadloom weaver at Atibie-Kwahu in the Eastern Region. Her name is Lizy. According to her, she learned the skill of weaving in Kumasi. She owns a shop at Atibie where she weaves on an all-metal structure broadloom, sells batik and tie – and – dye and video/audio CD cassettes. The researcher wanted to compare how she carries out the broadloom weaving processes to what he discovered in Sackey (2002) and Akwaboa (1994) literature. The size of her loom and the reed can only permit her to weave a fabric width of up to 24". Few of the findings contradict what these writers said on broadloom weaving processes. These findings, however, work out perfectly well for the weaver. The findings include:

1. She does not make use of weavers' knot when a yarn breaks. She knots a broken yarn in the ordinary way of joining a broken thread. During warping, the hank of yarns she uses does not unravel easily. This results to continuous breaking and knotting of the yarn at short lengths. These numerous knots pass freely through the dents of her raffia reed without interfering with the actual weaving process.

2. She uses the heddling hook for two purposes: for heddling and for reeding. There was nothing like reed hook and heddling hook used for two separate weaving processes. She does heddling and reeding so fast and with ease.

The design stage in weaving was completely absent. She works with coloured warp strips but has no plan of the arrangement of the warp on paper. Plate 2 shows Maa Lizy and her apprentice heddling.

Plate 2: Broadloom weaver at Atibie (right) busily heddling with her apprentice

The researcher made yet several visits to another broadloom weaver whose studio is situated at Ayigya, near KNUST- Kumasi in the Ashanti Region. Mr.

Asante is his name. He started learning the skills of weaving in 1987. He set up his own weaving shed and began weaving in 1991 after passing out of apprenticeship. He weaves with the standard size broadloom and has three looms that have one set of lams each. With ease, Mr. Asante could mill and beam 25 yards long of a warp. It was observed that except for one, all the other processes he followed on the loom were the same as the literature from Sackey (2002) and Akwaboa (1994). He follows the same knotting skills as used by the weaver at Atibie – Kwahu. The observation showed that his skill of joining broken yarn worked perfectly well for him when he was weaving. "Designing" being the first weaving process was completely absent throughout the researcher's observation. He mostly works with coloured warp strips but has no plan of the arrangement of the warp on paper. Clearly, it was observed that he could do this because of his 19 good years of experience in weaving on the broadloom. Plate 3 shows Mr. Asante raddling at Ayigya in Kumasi

Plate 3: Mr. Asante raddling at Ayigya in Kumasi

4.4 Phase Two: Video Filming Processes and Content

4.4.1 Results From Filming The Video

Since the project was to document all the broadloom weaving processes in video, it became necessary to employ professional hands in the field of video coverage and editing. Other experts in weaving were also employed.

The filming took place in the art studio of Abetifi Presbyterian Senior High School. A quiet environment was necessary so the researcher erected a notice board (Plate 4) to alert students.

Plate 4: Inscription on notice board to alert students.

Eric Agyakwa Okyere who did the filming used a Sonny Video camera. Being the first time of the researcher engaging in such a video documentary, a lot of rehearsals were made in order to build his confidence in terms of speech and actions.

In most manufacturing companies including weaving industries all over the world, designing is very important in the line of production. The structure of the weave which was simple one up, one down (plain weave) was first designed on white cardboards used in the video as Teaching and Learning Materials. On the first cardboard, the researcher plotted the woven structure of the plain weave on top and below it was an open weave structure of the same weave that clearly shows the individual warp and weft. This was done to ensure easy understanding of the weave structure. On the second cardboard paper was the plot of the corresponding draft and peg plan / tie-up of the weave structure. Plates 5 and 6 below show a plain weave structure and its corresponding draft and peg plan.

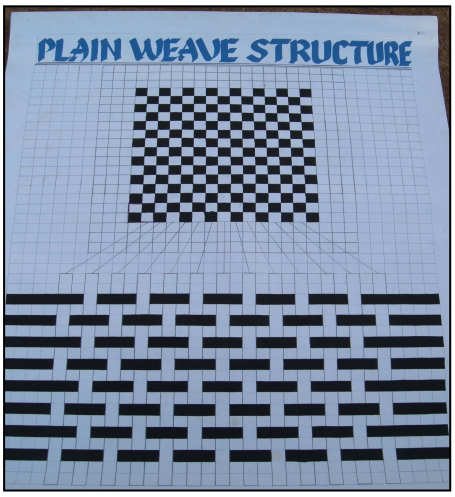


Plate 5: Plain weave structure

Plate 6: Corresponding draft and peg plan.

4.4.2 **Steps in Video Documentation**

Step 1: The video documentary started with the broadloom, its parts and how they function as well as the accessories used in weaving as explained in Chapter Two. (See Pages 13-17).

. The front view, back view and side views of the loom were shown in the video. The parts and their function were also mentioned. Plate 7 shows the broadloom with one set of lam.

Plate 7: The broadloom with one set of lam

Step 2: This procedure for data collection was on weaving materials. It is obvious that the chief material used for weaving is the yarn which comes in different packages as hank, cheese, coke and cones. Yarns in cones were used for this research because they are available on the open market and are easy to unwind from their package. Plate 8 shows packaged cones in different colours.

Plate 8: Packaged cones with different colours.

Step 3: Prior to warping, the weave structure design, its corresponding draft and tie-up was fixed on the chalkboard in the art studio and explained in terms of:

- The design
- The draft
- The peg plan or tie-up

Design in weaving is a careful construction of the order in which the warp and weft yarns should interlace. The draft shows the order in which the warp yarns or ends should be threaded through the eyes or loops of the healds and the number of healds used for the design. The Peg plan or tie-up is the selection of healds to be raised or lowered to create a shed. These factors were explained by the researcher to help students understand them. Before warping, particulars of the fabric to be woven, including the total number of ends, must be in the mind of the weaver. The warp calculation and cloth particulars used in the documentary are explained in step 4 as follows:

Step 4: Cloth Particulars

- Fabric structure : Plain weave
- Warp : Blue cotton
- Weft : Blue cotton
- Ends per dent : 2
- Cloth width : 20 inches
- Reed density : 20 dents per inch
- Raddle : 2 dents per inch.

Warp Calculation

- Total ends = Reed density × Width of cloth = 20 × 20 = 400
- Selvedge ends = ½ inch of the reed ⇒ 10 ends.

Total selvedge ends = 10 ends × 2 (cloth has 2 selvedges) = 20

Therefore, total ends including selvedge ends = 400 + 20 = 420

- Raddle used has 2 dents per inch. Therefore ends per dent of the raddle will be total ends ÷ Number of raddle dents.

  = 400 ÷ 40 =10 ends

Raddling will therefore be 10 : 100 : 10. That is 10 ends at the selvedge of both sides of the cloth.

Knowing the total number of ends a weaver will need to produce the fabric, the researcher measured the length of fabric to be woven on a ruler and added extra

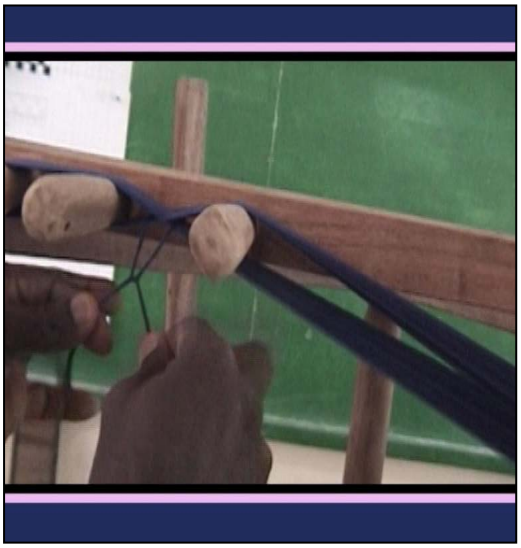
length to it. In all, he measured 4½ yards; 1½ yards was added as extra length for three reasons.

1. Technically, weaving cannot be done to the final end of the warp.
2. In tying the warp to the frying rod/apron stick of the cloth roller, some length of the warp is wasted.
3. Because the warp will stretch in the weaving process, it will shrink and return to its normal state.

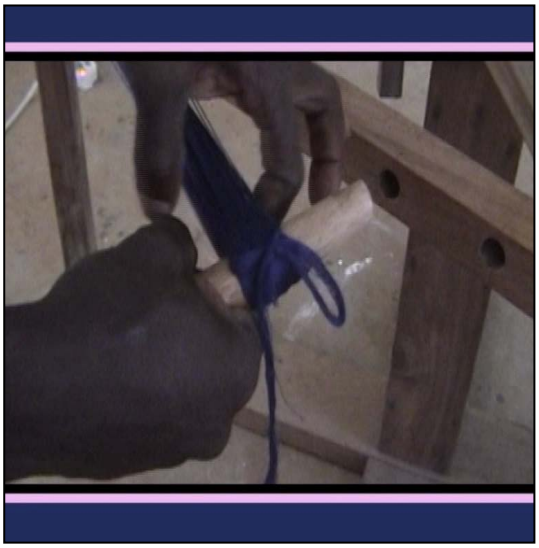
Step 5: Starting with warping, the researcher tied the 4½ yards length of yarn he used as a guide thread around the peg at the starting point of the warping mill. He then began warping. When he got to the point where the crosses are made, thus the point with three pegs on top the mill, he led the yarn under the first peg, on top of the next two pegs, under the same two pegs and finally on top of the first peg then the yarn went back to the starting point. He then took the blue yarn, fixed two of them in the spool rack, plied them and began to warp. From the starting point of the warping mill to where the crosses are made on top of the mill and back to the starting point is counted two. During warping, the researcher continued the counting until the milling of 420 ends was successfully done. The images below were captured from the actual video which documented all the weaving processes. Consequently, they lack picture quality as in the case of photographs. Plates 9 show the warping processes.

Plate 9: Warp laying on the mill.

Step 6: After warping, the researcher secured the crosses made during warping with a loose knot both on top and at the bottom where warping started. This was followed by the removal of the warp from the warping mill as shown in Plates 10 below.



(a) Preserving the Cross



(b) Starting Warp Removal

(c) Removing the Warp by Chain Stitch (d) Ending Warp Removal

Plate 10: Securing crosses and removing the Warp

Step 7: The next weaving process was raddling. Before raddling, the researcher first disconnected the cords connecting the heddle frames to the lams. This was done to all the in order to give free space for the raddling process. See Fig. 2 on Page 14 for heddle frames.

After disconnecting all the cords that connect the lams, the raddle was then opened at the top and tied to the sley or beater on both sides to hold the raddle in place. The sley being a movable part of the loom is also tied to the vertical beam in order not to disturb the raddling process. Plate 11 shows the raddle on the sley.

Plate 11: Raddle on the sley

The shed sticks were then passed through the crosses and secured with cord before the thread that was used to secure the cross was cut and removed. The first shed stick was stationed by tying it to the warp beam for easy raddling as shown in. Plate 12.

Plate 12: Securing the crosses with shed sticks before raddling

With someone pulling a section of the warp from behind, the researcher began to count the warp ends into the dents of the raddle. Ten of the ends were

counted for each raddle dent. It should be noted that raddling takes even numbers of ends. Plate 13 shows how the warp was counted.

Plate 13: Raddling process

After raddling, the ends were cantered in the dents of the raddle before the cap of the raddle was closed.

Step 8: The researcher then stretched the warp to the beaming or tensioning box. The warp was put around a round wood fixed to the tension box. Cement block was then put inside the box to ensure enough weight for tensioning. In order to prevent any entanglement during beaming, the group of warps in each raddle dent were straightened and made to lie apart from each other. Plate 14 shows how the warp was straightened and weighting of the beaming box.

(a)

(b)

Plate 14 (a): stretching the warp and (b) weighting tensioning box

Step 9: Next stage was to transfer the crosses at the back of the loom to the front side of the loom. In doing this, the researcher moved the crosses that were secured by the shed sticks to the beaming box as shows in plate 15.

(a)

(b)

Plate 15 (a): Inserting shed stick and (b) Crosses moved to beaming box.

The researcher then began to wind the warp unto the warp beam. Beaming sticks were put around the warp beam from time to time during beaming to ensure proper tension of the warp as shown in Plate 16 (a) and (b).

(a) (b)

Plate 16 (a): Winding warp unto warp beam and (b) Tensioning with beaming sticks

When the beaming box got to the loom, the warp was removed and human tension was used to pull the warp for the rest of the beaming to continue as shown in Plate 17.

(a) (b)

Plate 17 (a): Beaming box near loom and (b) Human tension for beaming.

After beaming, the warp was cut open, straightened and divided into two. The raddle was then removed after which each half of the warp was secured with a loose knot to avoid slippage. The researcher then re-fixed the heddles for heddling to take place.

Step 10: The first half of the warp was untied, a section of it was picked and heddling began. Each end was led to passed through the eye of the healds in the order of 1, 2, 3, 4 repeat using the heddling hook. When a number of ends had been heddled, the warp was tied with a wisdom knot in order to prevent them from slipping off the eyes of the healds. Plate 18 shows heddling.

Plate 18: Heddling

When heddling was about to be completed for the first half of the warp, the researcher counted 10 ends to serve as selvedge ends. These ends were plied again (two ends containing four yarns) and passed through each heald. In all, five healds were used for the total of 10 ends counted. This was done to make the selvedge compact and strong. The same process was done to the second half of the warp. The

researcher pointed out during the heddling of the second half of the warp that since the heddling of the first half started on the first heald and on the first shaft, the start of the second half should start on the first heald on the second shaft. After heddling, reeding was the next process.

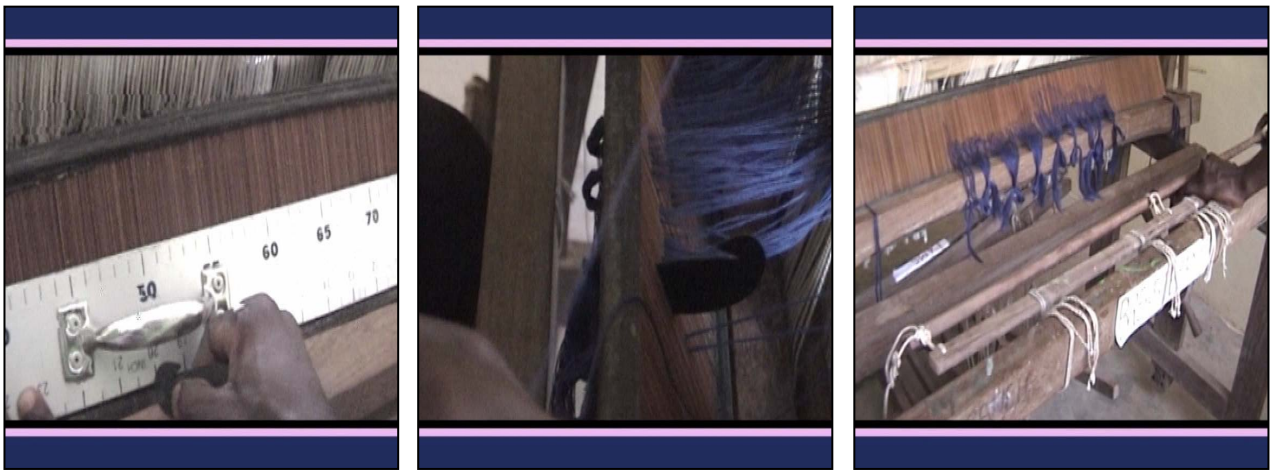
Step 11: Reeding is the process of passing the individual ends through the dents of the reed with a reed hook. Before reeding, the reed was cantered and tied to the sley and the sley was also tied to the vertical beam to station the reed in order not to disturb the reeding process as shown in Plate 19.

(a) (b)

Plate 19: (a) Tying reed to the sley and (b) Tying sley to the vertical beam

The middle of the reed was located using a metal rule in order to start reeding. The reed hook was led to pass through the dent of the reed; the yarn was hooked and pulled through the dent. This continued until the entire warp was exhausted. As it was done during heddling, a number of the warp was tied in front of

the reed with a wisdom knot from time to time to ensure that they do not slip off the dents of the reed. The same process was done to the second half of the warp. Plate 20 shows the procedure.

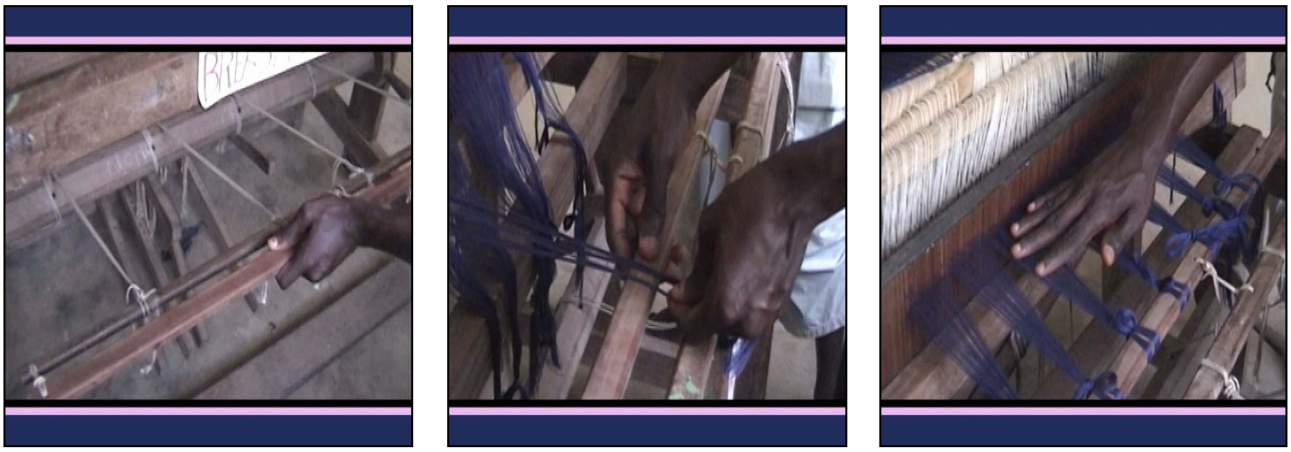


(a) (b) (c)

Plate 20 (a): Locating middle of reed (b) Reedingand (c) Tying warp to avoid slippage.

Step 12: Tie-up was followed just after reeding. The first tie-up was to tie the warp to the apron stick of the cloth roller. To do this, the researcher first released the apron stick by lifting the ratchet pawl to allow it free movement. The apron stick was led to pass under the breast beam and was brought on top of it to the weaving area for the tying process to begin. For the warp to reach the apron stick, the researcher released more warp into the weaving area by releasing the ratchet pawl and rolling the warp beam forward. The entire warp was pulled and the wisdom knots were untied for straitening of the individual ends. A section of the warp was picked, divided into two and tied to the apron stick at the extreme ends of the warp. Tying then continued to

the rest of the warp in the middle. This was done to maintain equal tension across the entire warp as shown in Plate 21 (a), (b) and (c).



(a) (b) (c)

Plate 21 (a): Releasing apron stick (b) Tying warp to apron stick and (c) Checking tension.

When the warp was stretched taut, the cord that was used to tie the reed and the sley was cut to allow free movement of the sley. By this time, the researcher explained that the warp is safe from slipping off the dents of the reed. The reed cap was then fixed back. The second tie-up was to connect the heddle frames to the treadles. This became possible after all the heddle frames were levelled with the castle by tying each of the heddle frames to each dent of the castle at both ends of the heddle frames. Plate 22 shows how tying of the castle is done to make the heddle frames level.

Plate 22: Levelling heddle frames with the castle.

Down the loom, the researcher disconnected all the six treadles which are used for twill weaves. He explained further that only two of them will be used for simple plain weave. The researcher showed how each of the four lams was connected to each heddle frame and the subsequent connection of the lams to the treadles. He explained that the cords that connect lam 1 and lam 3 are tied to any one of the six treadles whilst the cords that connect lam 2 and lam 4 are tied to the second treadle to produce a plain weave structure during weaving. After the tie-up, the castles were removed. Plate 23 shows the six treadles that connect the lams.

Plate 23: The six treadles

Step 13: Preparation of weft for weaving was the next process. The spool rack, bobbin winder and the bobbin were the main weaving accessories that were used at this stage. Two of the packaged cones were put on the spool rack which was followed by fixing the bobbin in the rod of the bobbin winder. Yarns from the two cones were plied and drawn to the bobbin for winding. After winding a sizable package that will fit into the shuttle for easy unwinding, the bobbin was removed and fixed in the shuttle. Plate 24 shows the step by step procedure for weft preparation and fixing weft in shuttle.

(a)

Putting yarns on the spool rack

(b)

Fixing bobbin in rod of the bobbin winder

Winding yarn on bobbin

Fixing bobbin in shuttle and guiding yarn through shuttles' eye

Plate 24: Procedure for weft preparation and fixing weft in shuttle.

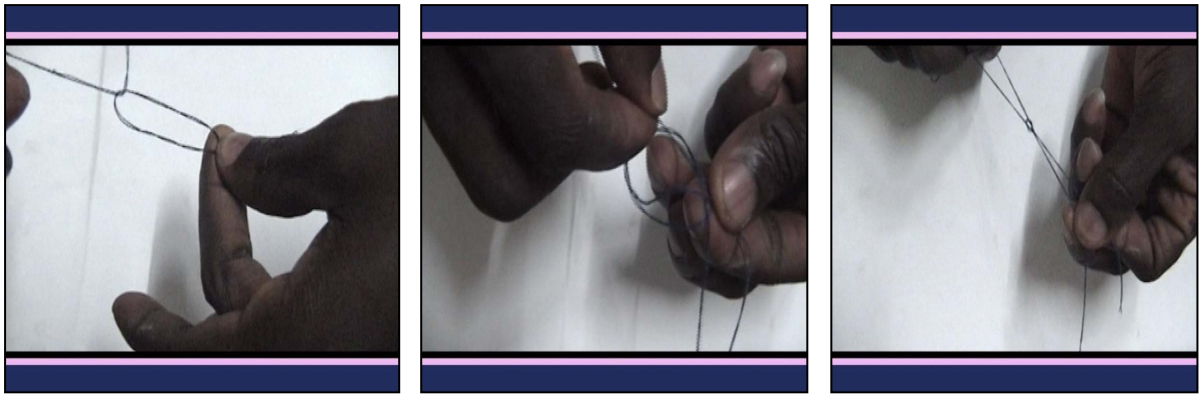
Step 14: The researcher, after preparing the weft, came back to the loom to start weaving. Three basic motions are involved in weaving. They are: depressing a treadle to create a shed, throwing the shuttle that carries the weft through the shed

(picking), and finally, pushing the laid pick to the fell of the cloth with the beater or sley (also known as beat-up). Plate 25 shows the motions in weaving.

(a) Picking (b) Beat- up

Plate 25: Weaving motions

When a pick broke or was exhausted from the bobbin, the researcher showed how to mend it by allowing the incoming pick to overlap the exhausted one in the middle of the shed. For neat selvedge, he also demonstrated the tucking in of the pick that hangs at the selvedge. He further indicated the procedure for locating and mending an end with a weaver's knot as indicated in Plate 26 (a), (b) and (c).



(a) (b) (c)

Plate 26: Procedure for mending broken end with weaver's knot.

The researcher also showed the two secondary motions of weaving: warp let-off and cloth take-up which allow easy shedding. He finally demonstrated how to use two shuttles when weaving a check fabric with a coloured warp.

4.5 **Phase Three: Using Video as a Tool for Teaching in Class**

4.5.1 **Results From Field Testing of Video Documentary With Students**

Since Action Research method was used in this project, the researcher field tested the Video Compaq Disc in the weaving studio of Abetifi Presbyterian Senior High School to determine its effectiveness as a teaching tool for weaving. Prior to testing the documentary, the researcher had taught the Forms 2 and 3 students all the theory of broadloom weaving. The two classes were taken through the testing process. In separate classes and with the researcher taking active part to ensure that the students viewed all the weaving processes captured on video.

The entire video documentary which has nearly two hours of viewing have been sub – divided into lessons as follows:

Lesson one – Parts of the broadloom

Lesson two – Designing

Lesson three – Warp preparation

Lesson four – Raddling

Lesson five – Beaming

Lesson six – Heddling

Lesson seven – Reeding

Lesson eight – Tieing – up

Lesson nine – Weft preparation

Lesson ten – Weaving

This breakdown was to prevent boredom and to sustain viewers' (teachers and students) interest in viewing the video to guide practicing of fabric weaving on the broadloom. This field test lasted for two months (May and June, 2010) since the researcher could only use the textiles periods on the school time table for SHS 2 and 3 classes as shown in Appendix D.

To break boredom and to make watching the video interesting, the entire two hour documentary has been grouped under lessons from one to ten.

With reference to the time table, SHS 2 class where the testing started have textiles on Mondays, Tuesdays and Thursdays. For the start, students were made to watch the entire documentary lesson by lesson twice to familiarize themselves with some technicalities involved in broadloom weaving processes. With the help of the researcher where necessary, they began to practice each of the weaving processes from the designing stage down to weaving on the broadloom.

Before practising, the researcher ensured that students, for the third time, watched and paused the documentary for each lesson before they practiced the weaving processes on the broadloom. Below are the days and time schedule and corresponding activity that took place within the month May, 2010 with SHS 2 students.

1st Week

Day/date	Time	Activities
Monday 3rd May, 2010	2 hrs	Viewing video documentary
Tuesday 4th May, 2010	2 hrs	Viewing video documentary
Thursday 6th May, 2010	1hr 20min	Paper weaving.

2nd Week

Day/date	Time	Activities
Monday 10th May, 2010	2 hrs	warping
Tuesday 11th May, 2010	2 hrs	raddling and beaming
Thursday 13th May, 2010	1hr 20min	raddling and beaming

3rd Week

Day/date	Time	Activities
Monday 17th May, 2010	2 hrs	heddling
Tuesday 18th May, 2010	2 hrs	reeding
Thursday 20th May, 2010	1hr 20min	tie – up

4th Week

Day/date	Time	Activities
Monday 24th May, 2010	2 hrs	weft preparation
Tuesday 25th May, 2010	2 hrs	weaving

Thursday 27th May, 2010	1hr 20min	weaving

SHS 3 class on the other hand had textiles on Tuesdays, Wednesdays and Fridays (See Appendix D).

Below are the days and time scheduled and corresponding activity that took place within the month of June, 2010 with SHS 3 students.

1st Week

Day/date	**Time**	**Activities**
Tuesday 1st June, 2010	2 hrs	Viewing video documentary
Wednesday 2nd June, 2010	2 hrs	Viewing video documentary
Friday 4th June, 2010	1hr 20min	Paper weaving.

2nd Week

Day/date	**Time**	**Activities**
Tuesday 8th June, 2010	2 hrs	Warping
Wednesday 9th June, 2010	2 hrs	Raddling and beaming
Friday 11th June, 2010	1hr 20min	Raddling and beaming

3rd Week

Day/date	**Time**	**Activities**
Tuesday 15th June, 2010	2 hrs	Heddling
Wednesday 16th June, 2010	2 hrs	Reeding

Friday 18th June, 2010	1hr 20min	Tie – up

4th Week

Day/date	**Time**	**Activities**
Tuesday 22nd June, 2010	2 hrs	Waft preparation
Wednesday 23rd June, 2010	2 hrs	Weaving
Friday 25th June, 2010	1hr 20min	Weaving

In order to avoid bias in the first place and to reveal the real strength and weaknesses of the instructional media in the second place, the researcher offered little or no help to students in times of difficulties. Where students find it difficult carrying out a particular weaving process, the researcher only played back the documentary for students to watch it well before they put the action to practice. If after playing back, the students still encountered problems, the researcher then offered help to students.

Below are pictures of students watching and practicing all the weaving processes during the field-test. Plate 27 (a) and (b) shows a section of textile students watching documentary on broadloom weaving.

(a)

(b)

Plate 27(a) and (b): Students watching documentary

Plate 28: Students doing plain weave structure with paper

Students beginning the warping process in Plate 29 (a), (b), (c), (d), (e) and (f).

(a)

Putting cone on spool rack

(b)

Making a cross

(c)

Beginning warping

(d)

Warping almost ending

(e)

Securing cross

(f)

Removing warp

Plate 29 (a), (b), (c), (d), (e) and (f) show students warping

Plate 30: Students Raddling

(a) Transfer crosses

(b) Beaming

(c) Human tensioning

Plate 31 (a), (b), (c) shows beaming processes

(a) Heddling

(b) Reeding

Plate 32: (a) Students busy doing Heddling and (b) Reeding

(a) (b)

Plate 33 (a): Levelling of heddle frames with castle and (b) tying warp to apron stick

(a) (b)

Plate 34 (a) and (b) shows a section of students preparing weft for weaving.

Plate 35 (a), (b) and (c) below show a student practicing weaving.

(a)

Shedding

(b)

Picking

(c)

Beat- up

Plate 35 (a), (b) and (c): The three basic motions in weaving

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 **Summary of Study**

In executing a project of this type, it becomes extremely difficult to attain perfection but with possibilities of human error, there may be lapses here and there which may limit the quality of the project. In line with the objectives of the study and research questions, the researcher field tested the video documentary at Abetifi Presbyterian Senior High School to determine its effectiveness for teaching fabric weaving.

In actual sense, the video could not capture all that happens after weaving a required length of a fabric. These are: winding the woven fabric onto the cloth beam, unwinding cloth from cloth beam and cutting woven fabric off the loom.

Observations made when students were carrying out the practical weaving during the testing of the documentary show that there is the possibility that the documentary will help solve if not all, the greater part of the problems confronting teachers and students on broadloom weaving processes.

The study clearly gives a comprehensive description with pictures that show step by step processes involved in broadloom weaving. It also discusses the findings and interpretation of results.

5.1 **Summary of Findings**

The summary of the main findings in this study have been grouped under the phases of the project.

1. **Phase One**

i. **Visit To Schools**

Observation revealed that the two private Senior High Schools where the researcher visited do not have the broadloom and its accessories for weaving. It was also found out in one of the private schools that the teacher who teaches textiles specialized in fashion during his HND course. In one of the public Senior High Schools, broadloom was not put to good use though it was in good condition. The researcher found that teachers do not teach practical aspects of theory lessons on weaving especially on broadloom weaving. Finally, the researcher found that Heads of Senior High Schools do not regard art as important as other subjects and so do not release funds requested from Heads of Department for Visual Art to purchase tools, materials and equipment for practical work.

ii. **Visit To Local Weaving Centres**

Inferring from Sackey (2002) and Akwaboa's (1994) literature on warp milling, crosses that create a shed were made with three pegs on the warping mill. The researcher saw the use of two pegs instead of three when he visited the two local broadloom weavers at milling. Comparing the two, the researcher is of the view that the use of two pegs ensures an easy way of making crosses but ideal only for expert weavers. One problem associated with this process is that the space created in

between the crosses becomes very small which may create problems for beginners when securing the crosses. The use of three pegs, however, is the best for beginners.

Akwaboa (1994) has explained how to join a broken warp yarn with the weavers knot. The researcher saw the ordinary way of joining broken yarn when he visited the local weavers. From the researcher's point of view, though each of the knotting styles works well, beginners must be cautious of the reed density and type (raffia/metal) used. The density of the reed determines the space gap in the reed. The smaller the density numbers the wider the spaces and vice versa. For instance 18s reed has wider dent gap than 30s reed. Also, warp yarns move more freely in raffia reed than metal reed which has the possibility of rusting (when not in use for some months) and which can create end breakage. The weaver's knot is the best way to join broken warp yarn when working with metal reeds of big count numbers.

The use of the castle to level the heddle frames before tieing – up of the treadles as explained by Akwaboa (1994) was not found with the local weavers. However, the weavers explained to the researcher that they only deal with plain weaves and that they use the castle to level the heddle frames once when they were setting up the loom.

The principle and processes of weaving were similar to what the researcher saw at local weaving centres. The processes involved in broadloom weaving (designing, warping, raddling, beaming, heddling, reeding, tieing – up, weft preparation and weaving) were followed systematically by the local weavers. Also, the principles of weaving (shedding, picking and beating – up) were followed.

2. **Phase Two : Filming of The Video**

Video documentary lacks the best picture quality. It was also noted that the video documentary does not show all that happens after weaving.

3. **Phase Three : Field-Testing Of Video**

Time span for field testing of the documentary was short. Consequently, the students could not get enough time to practice the weaving processes well. However, during paper plain weave, the researcher saw good skills demonstrated by the sample students. It was found that during warping, the yarn goes off track as a result of improper guide given by students during warping. It was noted that beaming was a bit worrying to students. The students were able to do the tieing – up but the process was very slow. Weft preparation was done perfectly. During the actual weaving, students always looked down the loom to see the treadle before they depressed it with the foot to create a shed and their facial expression showed that they found it difficult to depress the treadle. This was more prominent among the girls. The researcher also noted that some of the students found it difficult throwing the shuttle across the shed on the sley. However, beat – up with the sley was very easy. On the whole the students' participation was good.

5.2 **Conclusions**

In conclusion, this project has revealed the need for carefulness and patience in practicing broadloom weaving. All the stress and strains involved in weaving were also unveiled by the documentary. With time and practice, students practicing weaving will cultivate the habit of endurance, patience, self control, problem solving, careful thinking and self confidence unconsciously despite any other negative character they may possess.

It is believed that continuous viewing of this documentary and practicing all the weaving processes by teachers and their students will help bridge the gap between school based weaving and community – based weaving technologies. The rate of unemployment keeps increasing in the country every year. In a very small way, this project can contribute to reducing unemployment rate among the youth by equipping them with weaving skills.

The researcher again believes that the project will equip students, especially the final years, with the needed skills to meet the demands of the West African Examinations Council weaving project work. This will reduce the rate at which final year students take their weaving projects outside the school for help. Moreover, those who want to pursue the textiles course at the tertiary level can cope with the high standards of weaving required.

5.3 **Recommendations**

Due to the importance of weaving to the socio – economic development of the nation, the following recommendations are suggested:

1. Because the time span for testing the documentary was short, the researcher suggests that more extensive testing and use of the video is needed to refine and improve its effectiveness as a teaching tool.
2. The researcher recommends that the Disc be played in a DVD ROM and be viewed with all the needed attention because of the technicalities involved.
3. Since broadloom weaving is part of the textiles syllabus for Senior High Schools, headmasters should provide their schools with the needed weaving equipment, accessories and materials for practical weaving.
4. Textile teachers who find it difficult to teach practical weaving on the broadloom should call in resource persons to help them achieve the curriculum requirement.
5. The government should release funds regularly to Ghana Education Service to organize in-service courses for art teachers in Senior High Schools on art practicals.
6. The project report and its accompanying video documentary should be published and copies should be made available in libraries and educational centres throughout the country to serve as educational or research material.
7. Finally, the researcher recommends that interested researchers be urged to consider the possibilities of documenting traditional Kente weaving on the traditional loom for use in Senior High Schools which this project could not cover.

REFERENCES

Adgedu, G. O., Donkor F. & Obeng S. (1999). *Teach Yourself Research Methods,* Winneba: University College of Education.

Ahiagble, B. D. (2004). *The Pride of Ewe Kente.* Accra: Sub- Saharan.

Akwaboa, S. A. (1994). *Art for schools and colleges*. Kumasi: Samarg.

Albers A. (1965). *On weaving*. New York: Studio Vista.

Arthur, G. F. K., and Rowe, R. (2001). Akan Kente Cloths. Date last revised: 02 / 22 / 2007 (www.google.com).

Barbara, G. D. (1993). Tools for Teaching. Sam Francisco. Retrieved 02 / 02 /10 from (http://teaching. berkeley. edu/bgd/largelecture.html).

Best, J. W. (1981). *Research in Education (4th ed.)* Englewood Cliff, New Jersey: Prentice Hall, Inc.

Borg, W. R. (1997). *Educational research (2nd ed.)* New York: David McKay Inc.

Busha, C. & Harter S. (1980). *Research Methods in Librarianship: Techniques and Interpretation,* New York: Academic Press.

Chernysheva, N. (1981). *Handbook of Cotton Weaving,* Moscow: Mir Inc.

Cohen, L. & Manion, L. (1980). *Research Methods in Education (4th ed),* London: Halm Ltd.

Frankel, J.R. & Wallen, N.E. (1993). *How to Design & Evaluate Research in Education (2nd ed.)* Chicago: McGraw Hill Inc.

Frimpong, C. (1994). *A Beaming Device for Broadloom Weaving.* MA thesis, Art Education, KNUST.

Hower V.G. (1976). *Weaving, Spinning and Dyeing.* New Jersey: Prentice Hall Inc.

Leedy, P. D. & Ormrod, J. E (2005). *Practical Research: Planning & Designing (8th ed.)* New Jersey: Carlisle.

Lord, P. R., & Mohamed, M. H. (1992). *Weaving: conversion of yarn to fabric* (2nd ed.) England: Merrow.

Marjory, L. J. (1966). *Introductory textile science*. New York: Holt, Rinehart & Winston, Inc.

Pastore, S. R. (2002). *Dale's cone of experience on Principles of Teaching*, Bloomsburg University, PA 17815 – 130 (www. google.com).

Quartey, S. M. & Awoyemi, M. O. (2002). *Research Methodology in Education.* Winneba: K N A B Ltd.

Sackey, J. (2002). *Textiles Technology for schools and colleges.* Accra: Franks.

Sidhu K. S. (1984). *Methodology of Research in Education*. Sterling publishers private Ltd.

Welford, T. (1966). *The textile student's manual: An outline of all the textile processes from the origin of the fibre to the finished cloth* (6th ed.): Pitman.

Wynne, A. (1997). *The motivate series: Macmillan texts for industrial vocational and technical education*. London & Basingstoke: Macmillan.

http://rapidbi.com/created/coneofexperience - dale.html.

http://honolulu.hawaii.edu/inteanet/committees/FacDev/guidekk/teachtip/organize.html(9/17/2006).

http://en.wikipedia.org./wiki/Theory-of-multiple-intelligence.

Midwest Global Group, Inc. (2009). *African Textile & Handicraft Products.* 1-800-64-KENTE:email(kente@midwesttradegroup.com)(www.google.com).

Wikipidia, Free Encyclodidia.org/wiki/methodology.2007. (google.com).

APPENDIX A

INTERVIEW GUIDE FOR TEXTILE STUDENTS

What is your name?

How old are you?

What is the name of your school?

Which form are you?

Have you treated weaving? Yes / No

If No, why?

If Yes, what sort of weaving? Theory / Practical

If theory, which areas?

If practical, what type of loom did you use? Card / Table / Traditional / Broad

How many of such looms do you have in your school?

Can you name some parts of the broadloom?

Can you tell the function of the part you have mentioned?

Have you been taught how to weave on the broadloom? Yes / No

If No, why?

If Yes, what problem(s) did you encounter during the weaving?

How did you solve such problem(s)?

Which broadloom accessory or tool did you use in the weaving process?

Did you encounter any problem when you were using the accessory or tool?

Can you describe the accessory or tool? Thus, tell how it looks like?

What is its function or what is it used for?

Which type of yarn did you use? Cotton / rayon

How was the yarn packaged? Hank / cone / cake / cheese

What are the systematic processes involved in broadloom weaving?

Can you describe each of the processes?

APPENDIX B

INTERVIEW GUIDE FOR TEXTILE TEACHERS

What is your name?

How long have you taught in this school?

Did you major in textiles during your polytechnic / university course? Yes / No

If No, have you undergone any assess course in textiles? Yes / No

If No, how do you manage to teach the course?

Does your school has a loom? Yes / No

If No, why don't you have one?

If Yes, which type? Table / Traditional / Broad

Are there accessories for the loom that can make practical weaving possible? Yes / No

If No, why don't you have?

Have you ever taught your students practical weaving on the broadloom before? Yes / No

If No, why?

If Yes, what can you say about students' participation?

APPENDIX C

May/June, 2009 W.A.S.S.C.E

TEXTILES 3 (Project Work) 100marks

Answer one (1) question only

1. Design and produce a plain weave check material to be used to produce a lady's skirt for a friend's birthday party. Use not more than three colours including yellow for the warp pattern.

The yellow warp strip should be about 2cm wide and should be placed at both ends of the fabric immediately after the selvedge and balanced by another yellow strip of 1cm wide in the centre of the fabric.

The woven fabric should measure about 90cm wide and 270cm long.

2. Design and weave a Kente stole to be given as a gift to a grandparent celebrating his/her 60^{th} birthday.

Inscribe in the stole: Afenhyiapa. Add a strip of blue at both selvedges. The length of the finished work should measure 180cm long.

APPENDIX D

Abetifi Presbyterian Senior High School Time Table

2009/2010 Academic Year

S. H. S. 2

	1	2	3	B	4	5	6	7	8	L	9	10
	7-7:40	7:45-8:25	8:30-9:10		9:40-10:20	10:25-11:05	11:10-11:50	11:55-12:35	12:40-1:20		2:00-2:40	2:45-3:25
Mon	Textiles			R						U		
Tues				E					Textiles	N	Textiles	
Wed				A						C		
Thur				K						H	Textiles	
Fri												

S. H. S.3

	1	2	3	B	4	5	6	7	8	L	9	10
	7-7:40	7:45-8:25	8:30-9:10		9:40-10:20	10:25-11:05	11:10-11:50	11:55-12:35	12:40-1:20		2:00-2:40	2:45-3:25
Mon				R						U		
Tues	Textiles			E						N		
Wed				A	Textiles					C		
Thur				K						H		
Fri		Textiles										