INFLUENCE OF TEXTILE TEACHERS’ PEDAGOGICAL CONTENT KNOWLEDGE ON SENIOR HIGH SCHOOL GRADUATES PARTICIPATION IN MODERNISATION OF INDIGENOUS GHANAIAN TEXTILE INDUSTRY

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A THESIS SUBMITTED TO THE DEPARTMENT OF EDUCATIONAL COMMUNICATION AND TECHNOLOGY IN FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY (ART AND FASHION DESIGN EDUCATION) IN SCHOOL OF EDUCATION, KENYATTA UNIVERSITY

NOVEMBER, 2019
DECLARATION

I declare that this thesis is my original work and has not been presented for a degree in any other university.

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Supervisors’ Declaration

We confirm that the work reported in this thesis was carried out by the candidate under our supervision and has been submitted with our approval as University Supervisors.

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DEDICATION

To my late grandfather Mr. Abraham Kini Teyi Agbodzi Kassah and my children
Jerry Kofi Kassah (late), Joy Joachim Yao Kassah and Jennifer Yaa Fafali
Kassah.
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I further wish to express my appreciation to the Director-General and Director, Secondary Schools Division of Ghana Education Service, Accra, Ghana, all the staff of the senior high schools who assisted me during my data collection. I also wish to express my gratitude to the senior high school textile graduates working in the indigenous textile industry for attending to me during my data collection.
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# ABBREVIATIONS AND ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
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</tr>
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<tbody>
<tr>
<td>ANOVA:</td>
<td>Analysis of Variance</td>
</tr>
<tr>
<td>CRDD:</td>
<td>Curriculum Research and Development Division</td>
</tr>
<tr>
<td>GES:</td>
<td>Ghana Education Service</td>
</tr>
<tr>
<td>GETfund:</td>
<td>Ghana Education Trust Fund</td>
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<td>GT:</td>
<td>General Textiles</td>
</tr>
<tr>
<td>GTMC:</td>
<td>Ghana Textile Manufacturing Company</td>
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<tr>
<td>GTP:</td>
<td>Ghana Textile Prints</td>
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<tr>
<td>HND:</td>
<td>Higher National Diploma</td>
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<td>HoDS:</td>
<td>Heads of Department</td>
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<tr>
<td>HTU:</td>
<td>Ho Technical University</td>
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<tr>
<td>JHS:</td>
<td>Junior High School</td>
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<tr>
<td>KNUST:</td>
<td>Kwame Nkrumah University of Science and Technology</td>
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<tr>
<td>MA:</td>
<td>Master of Arts</td>
</tr>
<tr>
<td>M.Ed.:</td>
<td>Master of Education</td>
</tr>
<tr>
<td>MoE:</td>
<td>Ministry of Education</td>
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<td>MOTI:</td>
<td>Ministry of Trade and Industry</td>
</tr>
<tr>
<td>MPHIL:</td>
<td>Master of Philosophy</td>
</tr>
<tr>
<td>M-TECH:</td>
<td>Master of Technology</td>
</tr>
<tr>
<td>NGO:</td>
<td>Non-Governmental Organisation</td>
</tr>
<tr>
<td>NVTI:</td>
<td>National Vocational Training Institute</td>
</tr>
<tr>
<td>Ph.D:</td>
<td>Doctor of Philosophy</td>
</tr>
<tr>
<td>SHS:</td>
<td>Senior High School</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>SPSS</td>
<td>Statistical Package of Social Sciences</td>
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<tr>
<td>TTI</td>
<td>Tema Technical Institute</td>
</tr>
<tr>
<td>TTL</td>
<td>Tema Textiles Limited</td>
</tr>
<tr>
<td>TTU</td>
<td>Takoradi Technical University</td>
</tr>
<tr>
<td>UCC</td>
<td>University of Cape Coast</td>
</tr>
<tr>
<td>UDS</td>
<td>University for Development Studies</td>
</tr>
<tr>
<td>UEW</td>
<td>University of Education, Winneba</td>
</tr>
<tr>
<td>UG</td>
<td>University of Ghana</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
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<td>WAEC</td>
<td>West African Examination Council</td>
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Abstract

The purpose of this study was to investigate the influence of textile teachers’ pedagogical content knowledge on senior high school graduates’ participation in the modernisation of the indigenous textile industry. Textile training institutions in Ghana are designed to train the skills needed for the modernisation of the large-scale and indigenous textile industries. There have been numerous criticisms that the pedagogical content knowledge of textile teachers/lecturers do not equip the school graduates with the skills required to modernise the textile industries. Many studies have been done on the influence of pedagogical content knowledge of Ghana tertiary textile lecturers on the modernisation of the large-scale textile industry. However, many studies have not been done on the influence of pedagogical content knowledge of Ghana senior high school textile teachers on the modernisation of the indigenous textile industry hence the need for this study. The study was guided by the following five (5) specific objectives: to establish the influence of demographic characteristics of Ghana senior high schools textile teachers on school graduates participation in modernisation of the indigenous textile industry; to establish the influence of pedagogical content knowledge of Ghana senior high textile teachers on the skills acquisition of school graduates; to determine the nature of pedagogical strategies used by Ghana senior high school textile teachers in training their students; to determine the influence of challenges facing Ghana senior high schools textile training on the operations of indigenous textile industry; to develop a pedagogical model for modernisation of the indigenous Ghanaian textile industry based on the findings of the study. The study employed system theory. Purposive sampling was used to select senior high schools offering textiles, simple random sampling was used to randomly select textile teachers and snowball sampling was used to trace senior high school textile graduates working in the indigenous textile industry. The study design employed was a cross-sectional survey. The total sample size was 243 (225 textile teachers, 12 textile graduates and 6 HoDs). The research instruments used for data collection were a questionnaire, interview guide and non-participant observation. Inferential statistics such as a one-way-analysis of variance (ANOVA) and point-biserial correlation were used to test the null hypotheses formulated. The study found that the pedagogical content knowledge competencies of Ghana senior high schools textile teachers cannot equip school graduates with the skills needed to modernise the indigenous textile industry. The study also found that textile teachers used lecture and discussion methods of teaching than skill acquisition instructional strategies such as field trips, demonstration and work-based. The study recommended that the ministry of education should periodically sponsor textile teachers to have industrial attachments in both local and international renowned textile industries to learn modern skills of textile manufacturing. The study also recommended that work-based (industrial attachment) should be introduced into Ghana senior high schools textile training system.
CHAPTER ONE

INTRODUCTION

This study investigated the influence of textile teachers’ pedagogical content knowledge on senior high school graduates participation in the modernisation of the indigenous Ghanaian textile industry. The section gives the background to the study, the problem of the study, the purpose of the study, specific objectives of the study, the hypotheses, delimitation, limitation and significance of the study. The rest of the sections in this chapter are the theoretical framework, conceptual framework, and operational definitions of terms.

1.1 Background to the Study

Training is the process of passing on knowledge, ideas, skills, customs, and values, from one individual to another or from one generation to another (Adu-Gyamfi, 2016). According to UNISCO (2016), training is all instruction activities received throughout life, intending to upgrade knowledge, skills and competence, within a personal, public, and or job-related viewpoint. Mtulo (2014) states that training prepares the trainee on how to perform a particular task such as operating a plant or producing a product.

Training is a process of transmitting a special skill or attitude to an individual to enable him or her to perform a specific job effectively. According to Surbhi (2016), training is a programme designed to develop specific skills of manpower needed in the labour market. UNESCO (2016) outlines three types of training namely; formal training, non-formal training and informal training.
According to Eaton (2017), formal training is an organised training guided by an approved curriculum that leads to officially recognised pre-tertiary and tertiary certificates. UNESCO (2016) describes formal training as a training that is institutionalised, deliberate and provided by the government and accredited private bodies. It is a training designed to prepare students before their first entry to the job market. Formal training comprises training such as technical and vocational that prepares learners per the needs of the manufacturing industries (UNESCO, 2016).

Non-formal training is a training that is provided outside a training institution and characteristically learners are not awarded certifications that can enable them to get paid jobs in the labour market. This type of training is usually on a short term basis and it is normally offered in the form of updating workers knowledge and skills (Yasunaga, 2014).

Informal training is non-institutional and has no set objectives for training outcomes (UNESCO, 2016). Informal training is a system of training that are well planned but are not institutionalised. They are normally less designed than formal or non-formal training. Informal training may comprise training received in our household, workplace and society (UNESCO, 2016).

1.1.1 Structure of Education in Ghana

There are various levels of education and training. In Ghana, the formal structure of education and training (Appendix L) consists of three continuous stages
known as basic education, second cycle education and tertiary education (Education Act, 2008). The basic education comprises two (2) years of kindergarten, six (6) years of primary education (class 1-6) and 3 years of junior high school education. The basic education is designed to offer unbiased access to good quality and child friendly universal basic education by providing opportunities for individual children at kindergarten, primary, general junior high school levels and special primary and junior high schools (MoE, 2015).

The second cycle educational system in Ghana consists of either three years of grammar senior high school or senior high technical school, technical and vocational education or apprenticeship system (MoE, 2015). The second cycle education is to provide an opportunity for junior high school graduates to access three years of advanced education (MoE, 2015). The second cycle education is also to provide efficient foundational knowledge as well as skills to prepare a high-level manpower to make available highly skilled prospect tertiary graduates (Adu-Gyamfi, 2016).

The cycle education is provided by both private and various government organisations such as the Ministry of Education (MoE) through Ghana Education Service (GES) which enforces the policies outlined by the Ministry of Education. The public second cycle schools are funded by the Government of Ghana through the Consolidated Fund and the GETFund while the private second cycle schools, on the other hand, are funded by their owners.
National Vocational Training Institute (NVTI) is the body responsible for organising examination for technical and vocational institutes in Ghana while West African Examination Council (WAEC) is the body that organises final examination for the senior high schools and senior high technical schools in the country at the end of the three-year programme. The basic, second cycle and special schools constitute what is known as pre-tertiary education. Appendix K indicates the structure of the second cycle education and training in Ghana and the programme or courses they offer.

The tertiary education comprises university, polytechnic and colleges of education accredited by the National Accreditation Board (MoE, 2010). The number of years for tertiary education in Ghana comprises 2 years of a university diploma certificate, 4 years of colleges of education bachelor degree certificate in early childhood education, primary education and junior high education, 3 years of polytechnic education for HND, 4 years of university education for bachelor degree and 2 years top-up degree for HND holders. Students willing to further their education can do 1-year research master’s degree (M.Ed, MA, M-Tech) or 1-year non-research masters (MA, M.Ed.), 2 years master of philosophy (M.Phil.) degree and a minimum of 4 years Doctor of Philosophy (Ph.D.).

1.1.2 Historical Overview of Second Cycle Skill Training in Ghana

According to Kemevor and Kassah (2015), skill training, in general, began in Ghana in the year 1922, when four (4) technical and vocational schools were established in the Ashanti, Eastern, Greater- Accra and Central regions. The
programmes of study during that time were woodwork, metalwork and brickwork, which were considered necessary for raising the living standard of the Ghanaians. These skill training schools aimed to equip learners with employable skills that will enable them to create jobs for themselves and other people to reduce poverty in Ghana (Kemevor & Kassah, 2015).

The ambition to increase the socio-economic level of the individuals through technical and vocational training continued to be the priority of the colonial government and so in 1925, an additional technical institute was built at Yendi in Northern Ghana making the number of technical schools to be five (5). These technical institutions were progressing well until the Second World War when they were changed into military craftsmen institutes to train skilled labour personnel for the war (Kemevor & Kassah, 2015). When the war ended, these training schools were renamed as ‘Trade Schools. New programmes such as blacksmithing, metal machining, auto mechanics and electrical practice were added to the old programmes.

The colonial administration saw the necessity to open additional technical institutions and so in 1956, three more technical schools were established to train sufficient skilled labour needed to meet the demand of the industries. The “Trade Schools” were later on upgraded to award City and Guilds certificates after they were re-designated as “Technical Institutes” (Kemevor & Kassah, 2015). After independence in 1957, successive government had frequently reformed the technical and vocational training system in Ghana to make the skills training
system in the country more applicable to the demands of the industries, to improve the informal sector so as to reduce unemployment and poverty.

According to MoE (2015), the provision of skill training especially in second cycle institutions in Ghana is carried out by several sectors such as the Ministry of Food and Agriculture, Ministry of Employment and Labour Relations, Ghana Education Service, religious bodies and Non-Governmental Organisation (NGOs).

1.1.3 Visual Arts Education in Ghana Senior High Schools

Visual Arts is creative products perceived with a sense of sight, touch and can arouse emotion (CRDD, 2010). According to Kassah and Kemevor (2016), Visual Arts education is an essential and basic factor in the development of individuals. Kassah and Kemevor (2016) continue that Visual Arts is a vital and legitimate part of public education for all learners, in spite of their intrinsic ability or academic capability. Visual Arts education provides skill and knowledge not found in any other subject area.

Boulder Valley School District (2014) states that Visual Arts education permits students to develop and exercise their creative potential, to perceive the significance of our ideas, opinions, and to respect those of other people. The Visual Arts education allows us to imagine divergently and explore further than the limitations of what is recognised. The Visual Arts education engages learners
sensibly, individually, physically, and emotionally than other subjects in the curriculum (Boulder Valley School District, 2014).

In Ghana, the senior high schools’ visual arts programme is structured such that each student offer 1 two-dimensional (2-D) art subject (graphic design, picture-making & textiles and 1 three-dimensional (3-D) subject (basketry, ceramics, leatherwork, jewellery & sculpture) (CRDD, 2010). Students offering Visual Arts also pursue General Knowledge in Arts as a compulsory subject. In addition to the above elective subjects, each visual arts student offers English language, mathematics, social studies and integrated science as compulsory subjects.

1.1.4 Historical Overview of Textile Training in Ghana

The formal textile training in Ghana first started in Tema Training Centre now Tema Technical Institute (TTI) in 1965 to train technicians for the textile industries such as Ghana Textile Manufacturing Company (GTMC), Ghana Textile Prints (GTP) and many others (Ghana Skills Development, 2013). The Tema Technical Institute was built with the support of the Japanese Government in partnership with the Ghana Education Service (Ghana Skills Development, 2013). As part of the 1987 education review programme, the skills training in textile was introduced in the majority of senior high schools, technical and vocational institutes, Takoradi Technical University (TTU), Kwame Nkrumah University of Science and Technology (KNUST) and later on, in the University of Education, Winneba (UEW), Ho Technical University(HTU), Tamale Technical University (TTU), and Bolgatanga Polytechnic.
The purpose of the textile’s inception into the vocational training curriculum was to diversify skills training in Ghana. It was also to equip learners with employable skills so that those who are incapable to further their education may perhaps enter into industrialisation that would enable them to fit into society as useful citizens who can contribute to job creation and poverty reduction (Sintim, 2008).

1.1.5 Access to Textile Training in Ghana

Minor textile training is received at the Primary and Junior High (JHS) level to equip pupils with basic skills in textile design. Pupils who completed JHS could enter a Senior High School (SHS), Senior High/Technical School to offer a 3-year programme in visual arts in which the textile is one of the elective subjects. JHS graduates may as well enter technical/vocational institutes offering textile to pursue three years textile programme. Senior high school or senior high school/technical graduates can advance to the university for a certificate, diploma and degree courses or to polytechnics for higher national diploma (HND) programme in textile design or fashion and textile design or colleges of education to major in textile or any other non-tertiary courses in textile depending on the performance of the graduates in WASSCE.

Graduates who completed general textile (GT) courses in technical or vocational institutes may proceed to the Tema technical institute for technician part two courses in textiles before proceeding to the polytechnics for HND programme in textile. HND graduates from polytechnics may do a two year top-up for their
first degree in a polytechnic or enter KNUST or UEW to undertake first-degree Textile courses for three years. Postgraduate degree (Masters) in pure textile is pursued only in KNUST. There is no doctorate Textile programme in any of the universities in Ghana. Textiles students eager to pursue a doctorate in textile may enrol in the Ph.D. Art Education programme in KNUST or Art and Culture programme in UEW in which at the end they carry out their research in textiles.

The following universities: University of Ghana (UG), University of Cape Coast (UCC), and University for Development Studies (UDS) run the Textile programme under Home Economics programmes thus Clothing and Textile up to postgraduate level. Except for Takoradi Technical University (TTU), Tamale Technical University (TTU) and Ho Technical University (HTU), all the other technical universities in Ghana also run the Textile programme beneath the Fashion Design programme.

1.1.6 Pedagogical Content Knowledge Competencies of Teachers

According to Ogolla (2015), pedagogical content knowledge of teachers is one of the major resources which stands out as crucial to the realisation of quality education and training and is being emphasised at all levels of education and training globally. Ismail and Rasul (2017) state that pedagogical content knowledge competencies of teachers are the driving force behind graduates' performance concerning the growth of industries. Shulman (1987) states that one of the vital qualities a teacher must possess to teach efficiently is pedagogical
content knowledge which is a type of knowledge that combines both content knowledge and pedagogical knowledge.

Pedagogical content knowledge of teachers comprises capability in conveying the theoretical approach, personal understanding and adaptive reasoning of the subject matter (Kleickmann et al., 2013). Pedagogical content knowledge is a blend of subject matter, students’ knowledge and a diversity of how subject matter is conveyed to students in and outside the classroom (Yusof & Zakaria, 2015). Pedagogical content knowledge of teachers means a blending of subject matter and instructional approaches into an understanding of how certain themes, problems, or issues are organised, represented and modified to the varied interests and abilities of learners (Hill, Ball & Schilling, 2008).

Kultsum (2017) states that pedagogical content knowledge is the amalgamation between content knowledge and pedagogical knowledge of the teachers in delivering a subject matter per the ability and interest of learners. Pedagogical content knowledge is the technique of describing and articulating a topic methodically to make it comprehensible for learners (Kumur, 2015). Lankford (2010) opines that pedagogical content knowledge is the knowledge teachers possess which permits them to impart subject matter effectively within a discipline as opposed to the knowledge of the discipline itself.

According to Ball, Lubienski and Mewborn (2001), pedagogical content knowledge of teachers involves the development and choice of tasks, the
selection of representations and explanations, the facilitation of creative classroom discussions, the understanding of student responses, the highlighting on learners understanding, quick and appropriate analysis of students errors and difficulties. An, Kulm and Wu (2004) state that between content, curriculum, and teaching, “teaching knowledge” is the basic component of pedagogical content knowledge.

According to Curriculum Research and Development Division (2010), the keen competition of the textile industry internationally has led to the defeat and nearly to the collapse of Ghanaian textile industries. To revitalise and promote Ghanaian textile industries, Ghana senior high school textile training curriculum (Appendix I) is purposely designed and geared towards the modernisation of the textile industries and also to create more employments and eradicate poverty.

Ghana senior high school textiles training is also designed to offer the school graduates the opportunity to gain enough creative skills and ability in textiles to practice vocation at the end of the school. Again, Ghana senior high school textile programme is designed to help school graduates contribute to the growth of science and technology, modernise textile industries, the economy, social well-being and our cultural identity (Curriculum Research and Development Division, 2010). However, these rationales have not been achieved over the years hence the need for this study.
1.2 **Statement of the Problem**

Textile training institutions in Ghana are designed to train the skills needed for the modernisation of large-scale and indigenous textile industries (CRDD, 2010). Textile training is an opportunity to empower school graduates with employable skills to boost the economy. Over the years, there have been numerous criticisms that the pedagogical content knowledge of textile teachers or lecturers do not equip the school graduates with the skills required to modernise the textile industries. Many studies have been done on the influence of Ghana tertiary textile training on the modernisation of the large-scale textile industry (Bruce-Amartey, 2014; Adikorley, 2013). Studies have also been done on the influence of pedagogical content knowledge of tertiary textile lecturers on the skill acquisition of the school graduates in Ghana (Sarpong, Haward & Amankwah, 2012).

At the secondary school level, studies done on the influence of pedagogical content knowledge of teachers focused on other subjects such as science, mathematics, business studies, and the English language (Kimotho, 2016; Tambara, 2015). However, many studies have not been done on the influence of pedagogical content knowledge of Ghana senior high school textile teachers on school graduates’ participation in the modernisation of the indigenous textile industry. This study investigated the influence of textile teachers’ pedagogical content knowledge on senior high school graduates’ participation in the modernisation of the indigenous Ghanaian textile industry.
1.3 **Purpose of the Study**

The purpose of this study was to investigate the influence of textile teachers’ pedagogical content knowledge on senior high school graduates participation in the modernisation of the indigenous Ghanaian textile industry. This entailed observation and analysis of the efforts by textile teachers to engage students in the modernisation of the indigenous textile industry through the use of innovative classroom lessons and the assessment of school graduates in the transformation of the indigenous textile industry.

1.4 **Specific Objectives of the Study**

The research was guided by the following objectives:

i. To establish the influence of demographic characteristics of Ghana senior high schools textile teachers on graduates’ participation in the modernisation of the indigenous textile industry.

ii. To establish the influence of pedagogical content knowledge of Ghana senior high schools textile teachers on the skills acquisition of school graduates.

iii. To determine the nature of pedagogical strategies used by Ghana senior high school textile teachers in training their students.

iv. To determine the influence of challenges facing Ghana senior high schools textile training on the operations of the indigenous textile industry.

v. To develop a model for the modernisation of the indigenous Ghanaian textile industry based on the findings of the study.
1.5 **Hypotheses**

The study tested the following null hypotheses:

i. **H₀₁**: There is no statistically significant relationship between Ghana senior high schools textile teachers’ demographic characteristics and school graduates participation in the modernisation of the indigenous textile industry.

ii. **H₀₂**: There is no statistically significant relationship between textile teachers’ pedagogical content knowledge and skills acquisition of Ghana senior high school graduates.

iii. **H₀₃**: There is no statistically significant relationship between the nature of pedagogical strategies used by Ghana senior high school textile teachers and school graduates’ participation in the modernisation of the indigenous textile industry.

iv. **H₀₄**: The challenges facing Ghana senior high school textile training have no statistically significant influence on the operations of the indigenous textile industry.

1.6 **Significance of the Study**

This study provides a process model that can help Ghana senior high school textile graduates to modernise the indigenous textile industry. Thus, how a textile teacher can acquire new subject matter skills and modern technological means of transmitting the new skills school graduates needed to modernise the indigenous textile industry. The study provides information about challenges
facing pragmatic senior high school textile training and indigenous Ghanaian textile industry.

1.7 Limitations of the Study
The distance from my place of residence in Ghana to the target population was a challenge since the researcher had to travel for about 16 hours on deplorable roads before reaching some respondents especially the ones in the Northern part of Ghana. However, with the aid of research assistants, enough data were collected. Another limitation was how to get textile teachers to provide data for this study since most of the schools which used to offer textiles had stop offering the subject. Lack of data on the location of textile graduates working in the indigenous textile industry was another hindrance, but the researcher used a snowball sampling technique to obtain an acceptable study sample.

1.8 Delimitations of the Study
There are many public and private senior high schools in Ghana but not all of them are offering textiles. The study was delimited to only public senior high schools (SHS) offering textiles in the Volta region, Ashanti region and Northern region of Ghana.

1.9 Theoretical Framework
The study employed systems theory (Mele, Pels & Polese, 2010). This theory was originated by Ludwig von Bertalanffy in 1968. He highlights that actual systems are open to, and interrelate with their surroundings and that they can
obtain qualitatively fresh assets through emergence, leading to constant development. According to Cordon (2013), a system refers to frequent cooperation or inter-reliance collection of parts that are highly interrelated to achieve an overall goal. A system is normally viewed as having numerous inputs, which go through certain processes to come out with certain outputs which together help to attain the overall set goals for the system.

Systems operate at different levels. Thus, open or closed. Open systems interact with their environments whilst closed systems never interrelate with their environment. Systems, like Ghana senior high schools, are considered as an open system because they relate freely with their environments (indigenous textile industry, clients, and educational stakeholders). Generally, institutions may be seen as open systems that take up inputs from the environments and through a chain of activities alter these inputs into outputs to attain a certain goal (Owen, 1998).

In the perspective of the systems theory, institutions, for example, receives assets such as human resources, funds, materials and information, transform them and return them to the community (the public) in the form of experts. In the context of the system theory, institutions for example, admit students and through resources (personnel, finances, materials & information), alter them and return them to the environment (society) in the form of changed individuals. This is what makes institutions as open systems. Bertalanffy (1968) as cited in Limboro (2012) observed the systems theory as a high-level concept that can be utilised
as a working assumption whose task is to offer a theoretical model for describing, forecasting and measuring an occurrence. Systems thinking is a theoretical approach to comprehending a phenomenon through investigation.

Owen (1998) states that the systems theory is viewed as an input-process-output system or as an input-output production model that comprises five factors. These factors are input, output, process, environments and result. By using this model, it is therefore likely to inspect an institution about whether it is realising its outlined goals or otherwise. This is because every organisation needs clear aims and objectives which determine the nature of inputs, the sense of activities to achieve outputs and the realisation of organisational goals. Feedback about the performance of the system and the effects of its operation on the environment are also measured in terms of achieving the objectives.

The input-output production model is a process that involves the transformation of raw materials through processes into products ready for use by the consumers. The production process in any industry is therefore, a theoretical construct based on the production function, which describes the physical relations between the industries’ input of resources and the output produced. In this study, an input-transformation-output model of the systems theory was employed to analyse Ghana senior high schools offering textiles in terms of whether they are achieving their set objectives. Blaug (1969) states that in the production process, a firm is the basic unit of economic production, which uses a diversity of inputs to produce outputs.
In this study and based on the theory of production, Ghana senior high schools offering textiles are considered as industries that utilise a variety of inputs to produce outputs. This means Ghana senior high schools offering textiles are equated to enterprises which take raw materials (students) and other inputs (textile teachers pedagogical content knowledge, nature of pedagogical strategies, curriculum, training resource & facilities) which interact through the processes of teaching/instruction (classes, practicals, research-based projects, field trips and industrial attachments) to produce a certain (school graduates with skills needed to modernise the indigenous textile industry).

1.10 Conceptual Framework for the Study

![Conceptual framework diagram]

**Figure 1.1: Conceptual framework**
In figure 1.1, Ghana senior high schools are recognised to be the trainers of skill man-power and the researchers that can aid in modernising the indigenous textile industry. In this conceptual model, production is observed as a conversion of inputs (learners lacking certain relevant technical know-how) into outputs (school graduates equipped with adequate knowledge and skills). The inputs are converted into outputs following chains of assignments such as instruction learning procedures through classes, relevant curriculum, field trips and research. Also, the renovation can be conceptualised in a form of achieving the aims otherwise in the form of satisfying the demands of the purchasers or end-users.

One of the aims of Ghana senior high school textile training is to equip school graduates with the skills needed to modernise the indigenous textile industry. As a result, the systems theory was considered suitable in this study because Ghana senior high schools offering textile admit inputs or raw materials in the form of students without desirable knowledge and skills. These raw inputs (students) are expected to interact through teaching and learning instruction to transform them into experts with adequate knowledge and skills and then return them to the society in the form of experts that can help bring modernisation to the indigenous textile industry and also create more jobs for themselves and other people in the community.

It is expected that if the following inputs, (i) demographic variables of textile teachers (ii) pedagogical content knowledge of textile teachers (iii) nature of
pedagogical strategies (iv) there is a provision of adequate physical facilities, up-to-date modern tools/equipment and (v) enough and quality resource materials, then this could lead to the highly skilled preferred outputs (graduates) with relevant skills that can help bring modernisation to the indigenous textile industry.

After evaluation, if the findings indicate that the Ghana senior high schools offering textiles have met their objectives and that the indigenous textile industry is satisfied with job performance of the graduates, then the pedagogical content knowledge of the textile teachers and mode of skill transmission can be said to achieve the goals of the senior high schools textile training. However, if the evaluation results indicate that the training objectives have not been met, and besides, the indigenous textile industry is dissatisfied with the graduates’ job performance, then this would call for urgent measures to be taken to address or rectify the situation. Depending on the actual problem/weaknesses identified, different actions such as improvement of the pedagogical content knowledge of textile teachers or change may be undertaken as is appropriate.

1.11 Summary of the Chapter

The concept of training and structure of education and training in Ghana have been discussed in this chapter. Pedagogical content knowledge has also been unpacked. The statement of the problem, the purpose of the study, objectives, hypotheses and significance of the study have been outlined in this chapter. Theoretical and conceptual frameworks have also been outlined.
1.2 Operational Definitions of Terms

**Indigenous Textile Industry:** Traditional or native textile industry.

**Industrial Growth:** Refers to the cumulative increase or qualitative and quantitative multiplication of productive processes in an economy.

**Model:** A replica of something produced by someone for somebody for some intention.

**Pedagogy:** The instructional methods and approaches a teacher uses to influence learning in learners.

**Pedagogical Content Knowledge:** This is a way in which a skill or knowledge is transformed for teaching and learning to take place. It is a blending of content and pedagogical strategies.

**Teacher:** A professional who can transmit knowledge and skills that will enable students to build, recognise and to gain skills that will be used to face the setbacks in life. A teacher can also be described as an expert that makes available to the learners' knowledge, skills and values that boost development.

**A Textile:** Textile explains a broad range of materials that are fabrics, both natural and artificial, that have been produced by weaving or through bonding fibres together mechanically, or manually to produce the fabrics.

**Textile Training:** Training relating to acquiring skills in the production of textile products, and the management of textile enterprises.

**Training:** Is the practice of teaching and learning that makes one perform a set of duties such as those which make up a specific job.
CHAPTER TWO
REVIEW OF RELATED LITERATURE

2.1 Introduction
This chapter reviewed related literature on the following sub-headings: influence of demographic characteristics of teachers on their competencies; influence of pedagogical content knowledge of teachers on skills acquisition of graduates; nature of pedagogical strategies use in the classroom and the operations of the indigenous Ghanaian textile industry.

2.2 Influence of Demographic Characteristics of Teachers on their Competencies

According to Kleickmann et al. (2013), pedagogical content knowledge is a key component of teacher competency that affects learners’ achievement. A competent teacher is a form of quality assurance for students’ learning (Ismail Nopiah & Rasul, 2017). Technical and vocational teachers’ competencies in terms of pedagogical content knowledge affect their students’ competency in the labour market. Competency is described as the success of a person in a specific profession. According to Aziz (2012), competency is an amalgamation of approach, knowledge, and skills and is a requirement for employees to carry out a job function.

According to Mirzagitova and Akhmetov (2015), teaching is a decision-making and teachers’ decision-making consist of applying pedagogic content knowledge and judgment in their work. Chakraborty (2013) states that the teachers’
decisions can be put into one of three groups. Thus, what content to teach, what students should do to learn the content, and what pedagogical strategies teachers should adopt to enable student learning. However, Komur (2010) highlights that the decisions teachers made concerning each of these groups (what content to teach, what students should do to learn the content, and what pedagogical strategies teachers should adopt to enable student learning) are also influenced by demographic characteristics of the teachers.

Mirzagitova and Akhmetov (2015) state that the demographic background of teachers denotes personal or collective background characteristics such as age, gender, socio-economic status, attitude, the teaching experience of the teachers, the number of students a teacher handles in a class at a given and qualification. Mirzagitova and Akhmetov (2015) state that teachers’ demographic variables have an influence on their pedagogical content knowledge and have an impact on students’ performance.

Teachers experience and academic qualifications have a major influence on their competencies and are the predictors of students’ academic achievement (Adeyemi, 2010; Yala & Wanjohi, 2011). But Adeyemi (2010), disagree that the educational level and teaching experience of the teachers are not statistically significant on their pedagogical content knowledge competency and students’ knowledge and skills acquisition.
Age, gender, professional qualifications and professional experience of teachers do not influence students’ academic achievement (Mirzagitova & Akhmetov, 2015). Many researchers and authorities endeavored to establish the type of teachers’ demographic characteristics that influence learners’ academic achievement in various subjects.

Kaighobadi and Allen (2008) tried to assess the influence of gender, age, ethnicity and other demographic characteristics on business students’ academic achievement and the findings indicated that the demographic variables of teachers have a statistically significant correlation with business students’ achievement in secondary schools. The study of Kaighobadi and Allen (2008) continued that the demographic features of teachers can be significant, since characteristics such as gender, age and culture background had been revealed to be connected to academic achievement of students.

The literature reviewed on demographic characteristics of teachers indicated that there are divergent views of the authors on whether demographic characteristics of teachers influence their pedagogical content knowledge and skills acquisition of the students. The literature reviewed also showed that the influence of demographic characteristics of teachers on their pedagogical content knowledge competencies were based on general and other vocational subjects which solidify the findings obtained in this study comparatively indispensable.
2.3 Influence of Pedagogical Content Knowledge of Teachers on Skills Acquisition of Graduates

Teachers’ pedagogical content knowledge is the bedrock of knowledge and skills acquisition of students that passed through their hands. The pedagogical content knowledge of teachers has been identified as one of the most vital influences of quality knowledge and skills acquired by graduates. According to Punzalan and Espinosa (2016), the 21st century has been a season of transformation, particularly in the field of science and technology education since the two disciplines have been recognised as the foundation of economic growth. In this view, teachers’ pedagogical content knowledge is perceived to play a significant role in attaining this goal in terms of the knowledge and skills they transmit to their students.

Olasehinde-Williams, Yahaya and Owolabi (2018) state that trained teachers normally demonstrate weaknesses in content knowledge because their training also concentrates on pedagogical strategies than content knowledge. Ishola and Udofi (2017) also contend that students’ knowledge and skills acquisition are seriously influenced by the teachers’ quality in terms of content knowledge and pedagogy knowledge than the students’ previous academic record or school students once attend.

According to Sarpong, Haward and Amankwah (2012), the pedagogical strategies used in training tertiary textile graduates in Ghana do not make learners acquire the necessary skills needed to modernise the textile industries.
King (2011) states that concerns regarding the transmission of the skills between training institutions and industries indicate that care must be taken particularly if the skills students needed to modernise industries are not acquired in the training institutions.

The principal purpose of textile training is the acquirement of appropriate job oriented skills for gainful employment in both informal and formal sectors of the economy. The necessity to link the skills textile graduates acquire from textile training institutions to the needs of Ghana textile industries is therefore, vital to bring modernisations to the industries. The technical and vocational skills acquired in the classroom must match the skills needed in the industries (Muzenda, 2014). Skills training should figure primary support for the success of the industries.

From the literature reviewed in this sub-section, it can be seen that most of the studies done on the influence of teachers’ pedagogical content knowledge on students’ skills acquisition focused on other subject teachers’ pedagogical content knowledge. The study done on the influence of textile teachers’ pedagogical content knowledge on graduates skills acquisition also focused on pedagogical content knowledge of tertiary textile lecturers on school graduates’ participation in the modernisation of the large-scale textile industry. This motivated the current study to investigate the influence of textile teachers’ pedagogical content knowledge on senior high school graduates’ participation in the modernisation of the indigenous textile industry.
2.4 Nature of Pedagogical Strategies Used in the Classroom

Pedagogical strategies are the techniques a teacher uses to ensure that teaching and learning take place in or outside the classroom. According to Adediran (2014), teaching brings about understanding and it includes a teacher, a student, content and teaching resources. Therefore, to ensure teaching and learning take place, the teacher must engage in some activities such as conversation, demonstration, giving instructions and all these are the various approaches to ensure that learning takes place (Adediran, 2014). According to Yusof, Roddin and Awang (2015), a traditional-teacher centred style is the main approach employed by teachers with the ‘chalk and talk’ (lecture method) as the most preferred teaching method used in teaching learners in the classrooms.

Yusof, Roddin and Awang (2015) state that several teachers attempt to talk and write on a chalkboard when teaching a lesson and this method has been found to limit learners active involvement in the classroom teaching and learning process which indirectly become a restraint for learners to facilitate the absorption of knowledge and skills prior to transferring it into an actual working condition. Learners may want to actively participate in the learning process. Besides, many students do not actively participate in learning because most of them do not have much space to be active in the classroom since they have to carefully listen and take notes of the lecture (Yusof, Roddin & Awang, 2015).

The pedagogical strategies use by teachers in the classroom and studios have been observed as a critical factor in delivering quality training (Mir, 2013).
According to Tuovinen (2008), Finland’s educational system has been adjudged as one of the most outstanding and well-performing educational programmes in the world due to the kind of pedagogical strategies their teachers use in the classroom. A 15-year-old pupil in Finland performed second in science, third in reading and sixth in mathematics internationally (OECD, 2010). These outstanding results have drawn a lot of international communities’ attention to the kind of pedagogical strategies used in Finnish classrooms during teaching and learning.

Pedagogical strategies used in Finnish classrooms emphasise profound and wide-ranging learning to give equal value to all aspects of the learners’ development of personality, moral creativity, knowledge and skills (Sahlberg, 2007). OECD (2011) opines that Finnish classroom teaching and learning are learner-centred where learners take an active role in designing their own tasks and work collectively in teams on projects. According to Mir (2013), schools in the United States over the years have been progressively employing learner-centred pedagogical strategies since the beginning of the 20th century.

Mir (2013) continues to state that in the United States of America, there is solid emphasis on student-centered pedagogies such as discovery learning, project-based learning, inquiry learning, hands-on learning, and co-operative learning while time is spent on passive teaching and learning (memorisation of materials) and formal mode of testing the learners is being curtailed. OECD (2011) observes that China teachers have moved away from traditional rote learning and
bookish knowledge pedagogical strategies to activity-based teaching strategies that increased learner participation after the 2001 national curriculum reform was implemented.

In Shanghai, for example, a 15-year-old learner had achieved very high average overall results on PISA 2009. This has been ascribed by local education specialists as fruitful reforms in which learners can integrate their knowledge and skills, make open-ended explorations and tackle real-life problems. According to Mir (2013), the pedagogical strategies in India classrooms are teacher-directed and guided instruction with minimum use of the play-way method, learning-by-doing and the activity-based method.

Yancy (2013) states that in Singapore, teachers do demonstrate more content knowledge than pedagogical knowledge and rote learning remained the most predominant pedagogy, compared to learner-centred. A study conducted in Nigeria by Igbokwe (2010) observes that several teachers still use the old style of teaching strategies in which the teacher is in charge of content knowledge and make the decision on what a student should do.

Amosa, Folasayob and Oluwatoyinc (2015) identify that teachers do not select suitable teaching strategies to be used let alone plan how to use them for efficient teaching and learning to take place in the classroom. Kigwilu (2014) in a study on pedagogical strategies has revealed that many skill training teachers prefer theoretical teaching over practical aspects of the skill acquisition subjects.
From the literature reviewed on the nature of pedagogical strategies used in classrooms across the world, it can be seen that most of the studies focused on pedagogical strategies used in basic school, secondary school and tertiary classrooms (Mir 2013; Dewan, 2009) but on other subjects. Many studies have not been done on pedagogical strategies used in Ghana senior high schools textile training hence the need for this current study.

2.5 Concept of Textiles

The term ‘textile’ is derived from the Latin word ‘texere’ which implies to weave. Textiles are initially woven cloth but the term is now applied to any production from fibers, filaments or yarns, natural or man-made obtained by interlacing (Sackey, 2002). The textile industry comprises growing or producing fibres, such as sheep farming and cotton growing, making of the fibre into thread, fabric production and decoration.

Sackey (2002) again opines that, early definitions of textiles point to cloths manufactured by weaving. Sackey (2002) added that for long, the term textiles has undergone numerous modifications, resulting in a broader scope to exemplify the development of a variety of fibres, fabric production and upgrading processes. The term ‘textiles’ explains a broad range of materials that are fabrics, both natural and artificial, that have been produced by weaving or by means of bonding fibres together mechanically, or manually to produce the fabrics (The British Museum, 2015).
Both Sackey (2002) and The British Museum (2015) definition of textiles point to the fact that textile is the art of making cloth by weaving. But The British Museum definition of textile suggests bonding of fibres together as another form of fabric production. Olajide, Fuyuyigbe and Ajiboye (2015) aver that textile is a broad term used to refer to any material manufactured by the interlacing of fibres such as fabric, carpet, and belt among others. Olajide et al., (2015) further explain that usually, the textile is elastic woven materials consist of a network of natural or made-made fibres that are often referred to as a filament or yarn.

Textile is defined as any strand, fibre or yarn which is capable of being made into fabric and the resultant material itself (Encyclopædia Britannica, 2010). This is a technical meaning of textile because of what it involves and conflicting it to Erlhoff and Marshall (2008) dissimilarity between unprocessed and transformed materials, both the cotton that is a woven cloth is made of (the raw material), and the woven cloth itself (the processed material) are described as textiles. Considering the literature review above, the definition of textiles limited to two categories.

The first is the production of natural and artificial fibres, yarns and fabrics that are used for clothing and other purposes rather than clothing. The second is concerned with the designing, purification, decoration and other chemical and mechanical processes that impart desirable qualities consumers want (Erlhoff & Marshall, 2008). The above literature on the definition of textile is limited since
textile goes beyond the production of fibres, yarns, fabrics and designing, decoration and finishing of fabrics.

2.6 Operations of the Indigenous Ghanaian Textile Industry

The indigenous textile industry includes cotton cultivation and yarn production, weaving, batik and tie-dye, printing, embroidery and smock industries.

2.6.1 Cotton Cultivation and Yarn Production Industry

This industry is mainly operated by women in Ghana especially northern Ghana women. This is because in the indigenous Ghanaian textile industry, there are divisions of labour among the sexes. For example, weaving is done by the men whilst spinning of raw cotton fibres into yarns is performed by the women (Amateye, 2009). The famous region in cotton cultivation and yarn production in Ghana is the Northern region. They supply the indigenous yarns to weaving industries across the country. After the harvesting the raw cotton, it is twisted into strings using indigenous tools (Amateye, 2009).

According to Amateye (2009), the indigenous spinning of raw cotton is done by placing the ball of cotton fibre on a spindle “jeni”. The ball of the raw cotton is held on the distaff in one hand, the stick of the spindle is wetted with saliva, and the fibre is then stuck upon it. Amateye (2009) continues that after stocking the fibre on the stick, the spindle is set revolving with a twist of the thumb and forefinger. The spinning process is commenced by first fluffing up the raw cotton
with the aid of a bow locally called “guntobu” so that even or uniform spinning process can be achieved (Amateye, 2009). See figure 2.1 and 2.2.

Figure 2.1: Fluffing up raw cotton using a bow-like gadget

Figure 2.2: Cotton on the distaff ready for spinning
To rotate the spindle for smooth spinning to take place, the spindle is normally placed on broken calabash or piece of smooth leather surface (Amateye, 2009). The fibre is pulled out and warped into an even thickness by turning the spindle with the help of the finger of the other hand, which is run skilfully up and down to pull out the cotton fibre (Amateye, 2009). The action of rotating the spindle first twists the cotton fibre and then winds the spun strand onto it. See figure 2.3-2.6.

Figure 2.3: Attaching a strand of cotton onto the spindle
Figure 2. 4: Setting the spindle revolving

Figure 2. 5: Spinning of cotton by hand
After spinning, the yarn is dyed with mud dye, locally known as “gara”. The leaves (garafanta) of the “gara” plant are harvested from the bush by women. The dye is obtained from the leaves by first crushing, pounding, and then dried for one week. After one week, the dried crushed or pounded leaves are soaked in a container for a night (Amateye, 2009). The mixture is then poured into a basket to strain the water. The mixture after straining remains in the basket and covered for about one month. The dye may be used on the third day but the longer it stays, the more potent it becomes (Amateye, 2009). During the storage period, the “gara” mixture decays and starts to produce heat that discharges smoke (Amateye, 2009). Refer to figure 2.7 and 2.8.
Figure 2. 7: Pounded *gara* leaves

Figure 2. 8: Decomposed *gara* leaves emitting smoke
An old mud pit kept over the years serves as the mordant for the dyeing process. The muddy clay locally referred to as “zata” is made into balls and dried. This could last for 3-7 days after which the dried balls are baked (Amateye, 2009). See figure 2.9 and 2.10.

Figure 2.9: Balls of zata being dried

Figure 2.10: Baked zata balls
A deep vault known as “kegaramang” is formed on the ground and filled with water to the lip. Potash (kedi) is poured into the “kegaramang” and a quantity of the decayed “gara” (thus the dye obtained from crushed leaves) is added (Amateye, 2009). The baked “zata” balls, are grinded, made wet, mixed with potash and then added to the solution in the container “kegaramang” (Amateye, 2009). The solution is then stirred thoroughly for about thirty (30) minutes.

To obtain a high potent dye solution, a quantity of the previews dye solution prepared from “gara” and “zata” clay ball is fetched in another container and a local dye known as “balba” is added to it and stirred. This more potent solution is then poured back into the previews solution in “kegaramang” and stirred for about 5-10 minutes (Amateye, 2009). After this, the solution is now ready for dyeing. See figure 2.11 and 2.12.

Figure 2.11: Gara vat dye ready for use
The dyeing is done by first warping the yarns to the required length and crosses fashioned for weaving. The crosses are then tied to prevent them from entangling when dyeing. The dyeing can be piece-dyeing or resist dyeing. Piece–dyeing involves immersing the whole yarn into the solution. In piece-dyeing, the dye colours every part of the yarn after dyeing. A piece-dyed yarn is known as “Jesinio” among Gonja people (Amateye, 2009).

The resist dyeing, on the other hand, is the technique of preventing some parts of the yarn from taking the dye during the dyeing process. It is mainly done to add a design to the yarn. A resist-dyed yarn is locally termed as “Kpalto” while the undyed yarn is known as “Balsu” among the Gonja (Amateye, 2009).
2.13-2.15 demonstrate the warping, resist dyeing and the resultant yarn after dyeing.

Figure 2. 13: Warping yarns prior to dyeing

Figure 2. 14: Resisted yarns prior to dyeing
After the dyeing process, the yarn is removed, squeezed and hanged for oxidation to take place. Oxidation is the reaction of the dyed yarn to the atmosphere to develop its original colour. Refer to figure 2.16 and 2.17.

Figure 2. 15: Patterned effect of yarn after resist dyeing

Figure 2. 16: Dyeing yarns by immersion

(Amateye, 2009)
2.6.2 Weaving Industry

The famous indigenous textile weaving industries in Ghana are located in Volta, Ashanti, and Northern regions. The weaving industry produces products such as “kete” or “kente”, traditional “tapestry”, “appliqué”, “fugu” and “adanudo” (Amateye, 2009). The people of the Volta region who are called Ewes produce numerous variations of “kete” and adanudo whilst the Ashantis produce “Kente” which is similar to the “kete” produce by Ewes in production but are varied in appearance (Amateye, 2009).

The Ewes employ a technique that gives their “kete” a one-faced design. The Northerners on the other produce “fugu” which is used to produce smock. The
famous weaving towns in the Volta region are Agbozume, Anlo-Afiadenyigba, Agòtime-Kpetoe, Kpando, Wheta, and Dzodze (Amateye, 2009). In the Ashanti region the popular weaving towns include Bonwire, Adanwomase, Ntonso, Maape, and Wonoo while in Northern region the legendary weaving towns are Tamale, Daboya, Kpatinga and Yendi.

Traditionally, cotton is spun into yarn and used for weaving (Amateye, 2009). Hand spinning in recent times is a rapidly dying art in Ghana. Handspun yarn is rubbed with starch and then dried before it is coiled on bobbins for utilisation. Several colours may be applied to the yarn to make it beautiful (Amateye, 2009). As indicated earlier, the indigenous weaving industry manufactures Kete/Kente using traditional looms.

The Ewes name for this traditional loom is known as “agbati” while the Asantis call it “Agbaaaaa”. The Northerners refer to this indigenous loom as “Granmn” (Amateye, 2009). The weavers in the Northern region and the Volta region make use of the typical native loom in their weaving industries whilst the Ashantis have the modified looms to contain well-built ones (Amateye, 2009). Figure 2.18 and 2.19 indicate photographs of various types of loom used in the indigenous Ghanaian weaving industry.
The indigenous weavers use cotton, silk, polyester, nylon, metallic yarns and rayon yarns for weaving. The cotton yarns are mainly purchased from the local
yarn industry while the other yarns are imported from India, China, and Pakistan. (Amateye, 2009). The operations of the indigenous weaving industry include preparatory activities and the actual weaving process. The preparatory activities are all activities done before the actual weaving on the looms. They include designing which is manually done from memory, beaming, warping, heddling, reading, tying-up and preparation of the picks or weft (Amateye, 2009).

**Designing in the Indigenous Textile Industry**

The indigenous textile artists employ numerous designing techniques even though this is not carried out on paper. This simply implies that the artists do the designing of the cloth in their memory before the weaving process instigate (Amateye, 2009). They use their cognitive abilities to plan the rhythm of colours, weave patterns, length and width of the fabric and the number of strips needed for full cloth. The designing is considered as the most vital aspect since it is considered as the control room at the weaving industry. The ability to critic and blend colours and patterns to aesthetically appeal is an excellent innovation of the craftsmen (Amateye, 2009).

**Warping**

Warping is the parallel formation of the yarns to obtain the yarns that run lengthwise in a woven cloth. After the memory designing by the indigenous weaver, warping is the next activity carried out in the industry. The Ewes call the warping “avor tsitisi”, the Asantes call it “ntomatene” while the Northerners especially Dagombas refer to the warping as “mihibahibu” (Amateye, 2009).
The indigenous warping is done by employing several spools arranged on a device called bobbin carrier. Among the Ewes, this bobbin carrier is known as “afofle” whilst the Ashantis’ refer to this implement as “menko me nam” (Amateye, 2009). The warping devices among the Ewes and Northerners are similar but slightly different among the Ashantis (Amateye, 2009).

The Ashanti weavers’ utilise two upright poles of about 80cm-90cm in height for their warping process. One of the posts is forked whilst the other is an ordinary post-like wooden peg (Amateye, 2009). These poles are spaced at a distance and determine the length of the ends/warp after a cord is tied in between and the foot used to calculate the distance (Amateye, 2009).

Among the Ewes indigenous weavers, numerous short wooden pegs are half-buried on the ground in two rows of about 20-30 feet at a distance. The first two pegs are used to create the crosses whilst the remaining pegs determine the length of the warp. The weaver then carries the “bobbin carrier” containing the yarns and moves lengthwise in and out several times to do his warping (Amateye, 2009).

Yarns are looped over the posts until the required length is achieved. The process is repeated alternatively on return creating a cross until the whole yarn on the bobbin carrier is exhausted. The length of the warp is always prepared a little bit longer than the required length of the fabric to be manufactured. This is to make provision for shrinkage, warp breaks during weaving and unprecedented wastage.
during the actual weaving process (Amateye, 2009). The crosses formed are cautiously preserved by holding them collectively with a cord before the removal of the warp from the pegs. To remove the ends (warp) from the pegs, the warp around the last peg beyond away from the crosses is first removed (Amateye, 2009).

This is then followed by chaining the whole length of the warp by loosely intertwining the warp to decrease the warp to a suitable length to handle the warp easily. Usually, the warp is wrapped around a flat piece of wood called “bobo” among the Ashantis whilst the Ewes normally wind the warp on a crossed stick or a looped stick called “agbakor” (Amateye, 2009). See figure 2.20 - 2.22.

(Amateye, 2009)

Figure 2. 20: Laying warp between two upright posts (“ntomatene”)
Figure 2.21: Warp laying round pegs on the ground

Figure 2.22: Wound yarn around crossed sticks after warping
**Beaming**

Beaming is the taut winding of the ends (warp yarns) on the weaving beam. In the indigenous weaving industry, the beam is normally a round smooth stick on which the warp yarns are wound before it is placed on the loom. After successful removal of the warp from the warping pegs, the warp is wound on the beam for hedding to take place (Amateye, 2009). See figure 2.23.

![Image of woven fabric](image-url)

*Figure 2.23: Wound warp after warping (Ashanti “bobo”)*

**Heddling**

Heddling is done by fleetling the individual warp yarns through the loop (eye) of the healds (heddles) with the aid of hedding or threading hook. The indigenous looms are stocked with two pairs of harnesses. The first set of the harness is
normally retained for weaving plain fabrics whilst the second set are employed for weaving fabrics intend to have motif or designs. Among the Ewes, the harnesses for weaving plain fabrics are referred to as “enoga” or “eno” while in Ashanti it is called “asatia” (Amateye, 2009).

The second set of the harnesses which enable the weaver to produce motifs or design in the cloths are known in Ewe as “enovi” and known in Ashanti as “asanan”. The Ghanaian indigenous looms normally have two heddles attached to the two groups of the harnesses. Heddling is normally instigated on the harnesses which can produce motifs or designs. The heddling process is done by inserting 4 or 6 ends through the loops or eyes of the design or motif producer heddle to cover the entire ends. Next, these warps are dispersed and slotted through the heddles of the tabby (plain) weave harnesses individually (Amateye, 2009). See figure 2.24 and 2.25.

Figure 2.24: Heddling among traditional Ashanti weavers

(Amateye, 2009)
Reeding

Reeding is the process of passing the warp yarns through the dents of the reed. The process is also known as denting. The reeding process is done by spreading the warp yarn to the required breadth of the cloth to be woven and then inserting the individual yarns through the dents of the reed with the help of reed hook. The reeding is usually done in the loom. After the reeding process, the reed and harnesses are tied up to the pulleys and hanged onto bars on the loom (Amateye, 2009). See figure 2.26.
Figure 2.26: Passing warp yarns through dents of the reed

_Tying-up_

The indigenous tying-up is carried out by first fastening the warp onto the cloth roller. This is followed by unrolling the warp, stretching it and attaching it to a heavy drag weight. Finally, the cloth roller is wound in the reverse to introduce tension in the warp (Amateye, 2009). See figure 2.27 and 2.28.

Figure 2.27: Tying warp yarns to cloth roller
Weft Preparation

The weft or woof or pick is the yarn that runs across the width of the fabric. The weft is normally interlaced with the warp to produce a cloth. In the indigenous Ghanaian weaving industry, weavers prepare two categories of woof yarns. These categories include binding woof and pattern woof. The binding woof is usually carried in a shuttle while the pattern woof is not carried in a shuttle.

Usually, pattern woofs are prepared thicker than binding woofs depending on the design to be produced and also to establish the heaviness of the cloth to be manufactured (Amateye, 2009). The indigenous weavers use wooden bobbins winders created by them for winding the yarn onto the bobbin of the shuttle for the binding weft. The woof preparation process is done by fixing the hank of
yarns onto the skein winder or a spool rack and wound onto bobbins with the aid of a bobbin winder (Amateye, 2009). See figure 2.29 and 2.30.

Figure 2. 29: Winding yarn for weft

Figure 2. 30: Shuttle loaded with weft for weaving
**The Actual Weaving**

During the actual weaving, the weaver presses the paddle or treadle to create a shed or opening in the warp. This is followed by fleeting the shuttle carrying the binding weft through the opening in the warp. The paddle is released and the weft is beaten-up with the reed (Amateye, 2009). The processes of creating shed, inserting the weft and beaten-up are repeated until a considerable plain weave is produced. To create motifs or designs in the cloth, the paddle that manipulates the third harness is pressed and a design woof is inserted with the finger sidelong the portion of the warp that matches with the design in mind of the weaver (Amateye, 2009).

The paddle is freed and the design weft inserted is beaten-up with the reed. Paddle four is then pressed and handpicked repeatedly and the paddle released again for the design weft to be beaten-up, followed by a binding weft simultaneously. Sometimes, a swordstick is employed to keep hold of the shed as the hand insertion of the design weft is carried out (Amateye, 2009). When the motif or design creation is complete, the plain weave is repeated to seal the design. See figure 2.31-2.34.
Figure 2. 31: Depressing treadles

Figure 2. 32: Shed created by pressing treadles (shedding)
Figure 2. 33: Throwing loaded shuttle through the shed (picking)

Figure 2. 34: Beating-up the newly inserted wefts together (beating –up)
2.6.3 Batik and Tie-Dye Industry

Tie-Dyeing

This is a resist technique of dyeing which involves folding, tying, sewing or knotting the fabric with raffia, twine nylon thread or any suitable material that is capable of resisting dye absorption before dyeing (Adu-Akwaboa, 1994). The process involves twisting, folding or crumpling the fabric, tying it and immersing it wholly or partially in the dye solution for 15 to 30 minutes. Where more colours are required, the tying and dyeing process is repeated as many times as the number of dye colours but, starting with the lighter shades and ending with the darker colour (Adu-Akwaboa, 1994).

During dyeing, the parts of fabric that are not tied or sewn absorb the dyes while the tied or sewn portions prevent dyes from penetrating the fabric. The two actions thus create varied designs in the fabric after untying it (Sacky, 2002). The actual colour of the dye develops after dyeing when the fabric is allowed to lie in the open for oxidation to take place. This occurs when the dyed fabric is either spread out or immersed in a solution containing an oxidising agent such as potassium dichromate or hydrogen peroxide where vat dyes are used (Sacky, 2002).

The whole process ends by washing, rinsing, drying and ironing the dyed fabric. This method can produce accidental colour and design effects which can be difficult to replicate. The technique is however, simple and cheaper to use in
decorating textile materials (Sacky, 2002). The following are the step-by-step processes involved in indigenous Ghanaian tie-dyeing:

i. Preparation of the fabric or shirt by folding, stitching, knotting. Refer to figure 2.35.


**Figure 2.35: Preparation of the fabric or shirt for dyeing**

ii. Preparation of the dye solution for 6 yards of fabric. This is done by:

- fetching 2 cup of warm water in a plastic cup.

- mixing 6 spoons of dyestuff, 18 spoons of sodium hydrosulphite and 12 spoons of caustic soda with the warm water.

- adding 9 spoons of common salt to the solution to serve as a mordant.

- mixing the prepared dye solution with enough water that can cover the whole fabric in plastic container. See figure 2.36.
iii. dipping the tied fabric in the dye bath for 15-30 minutes to dye the fabric. See figure 2.37.

Figure 2. 36: Preparation of dye bath

Figure 2. 37: Dyeing of folded and tie fabrics
iv. removing of the fabric after required time and drying under shade for oxidation to take place.

v. untying and drying of the dyed fabrics.

vi. ironing and folding of the finished fabrics. See figure 38.

![Figure 2.38: Finished tie-dye fabrics](https://www.contemporary-african-art.com/african-clothing.html)

**Batik**

This is also a resist technique of dyeing which involves stamping or covering the portions of the fabric that are not supposed absorb the dyes with a molten wax before the dye dyeing. Below are the processes involve in indigenous Ghanaian batik production:

i. melting wax in a pan. Refer to figure 2.39.
ii. Spreading the fabric to be dyed on a padded table and stamping with the molten wax. See figure 2.40.
iii. Preparation of the dye solution for 6 yards of fabric. This is done by:

- Fetching 2 cup of warm water in a plastic cup.
- mixing 6 spoons of dyestuff, 18 spoons of sodium hydrosulphite and 12 spoons of caustic soda with the warm water.
- adding 9 spoons of common salt to the solution to serve as a modant.
- Mixing the prepared dye solution with enough water that can cover the whole fabric in plastic container. Refer to figure 2.36 in page 61.

iv. dipping the waxed fabric in the dye bath for 15-30 minutes to dye the fabric. See figure 2.41.

![Figure 2.41: Dyeing of the waxed fabric](https://www.flyingfourchette.com/2013/10/11/making-batik-in-ashaiman/)

v. removing of the fabric after required time and drying under shade for oxidation to take place. Refer to figure 2.42. If two or more colours are required, the fabric is dried and re-waxed after drying.
vi. De-waxing of the fabric after drying by putting it in boiling water. See figure 2.43.

vii. Washing of the dyed fabric with soap after de-waxing to remove excess dyes. See figure 2.44.
Finally, ironing and folding of the finished batik fabrics while still dump to fix the colour permanently. See figure 2.45.

Figure 2.44: Washing of the dyed fabric to remove excess dyes

Figure 2.45: Finished batik fabrics
2.6.4 Dyeing and Printing Industry

The indigenous dyeing and printing industry produces cloth such as, “Kuntunkuni”, “Kobene” “Birisi” and adinkra cloth. “Kuntunkuni”, “Kobene” and “Birisi” are native mourning cloths produced by dyeing cloth with natural vegetable dyes extracts. “Kuntunkuni”, “Kobene” and “Birisi’’ are piece-dyed cloths on which adinkra designs are printed (Amateye, 2009). They are sometimes used on the piece-dyed state for funeral ceremonies. Adinkra cloth, on the other hand, is native or traditional fabric produced by printing or stamping a design on a dark coloured cloth (Amateye, 2009).

*Production of “Kuntunkuni”, “Kobene” “Birisi”*

“Kuntunkuni”, cloth is produced by immersing a plain fabric in dye solution derived from the root of the “kuntunkuni” plant. The dye is obtained by breaking, soaking, sieving and boiling of the root of “Kuntunkuni”. The process starts by breaking the roots into smaller particles (Amateye, 2009). The broken particles are soaked for some days and later on sieved to extract dye from the remains. The dye obtained is pre-heated before it is used to colour the fabrics. Usually, common salt is added to the dye solution to enhance the fastness of the dye and also to serve as a mordent.

The resultant cloth after dyeing is black and this is referred to as the “kuntunkuni”. Other colours are also produced from different plant sources. When a vermilion red, obtained from the plant is used to dye the fabric it is called
“kobene”; when indigo or near black or brown is used, the cloth is referred to as a “birisi”. See figure 2.46.

Figure 2. 46: Traditional method of Kuntunkuni dyeing

Adinkra Cloth Production

The production steps of adinkra cloth include dye or paste preparation, preparation of the stamps or screen, the printing of the cloth and finishing.

Dye or Paste Preparation

The paste or dye used for adinkra printing is natively known as adinkra-duro. The dye is normally extracted from the “Badie” tree and slag (etia). The process of extracting the paste involves:

i. peeling the bark of the “badie” tree using machete. Refer to figure 2.47.
Figure 2. 47: Peeled barks of ‘Badie’ bunched up

ii. Soaking of peeled bark to soften it for 24 hours during the rainy session and about 72 hours during the dry session. See figure 2.48.

Figure 2. 48: Soaked barks
iii. Pounding of soaked barks to break it into smaller particles. The pounding is carried out manually using a mortar and pestle. Refer to figure 2.49.

![Figure 2.49: Pounded barks ready to be soaked](Amateye, 2009)

iv. Soaking of broken particles of the "badie" tree for about 3-7 days. Refer to figure 2.50.

![Figure 2.50: Soaking pounded barks](Amateye, 2009)
v. Straining or sieving of soaked mixture (residue) to obtain paste. The sieving is done by using organdie (mesh).

vi. Initial boiling of the dye for about one (1) hour in chains of vessels. See figure 2.51.

(vii. Subsequent boiling of dye recipe for about four (4) hours until opaque liquor is obtained. This opaque liquor is the paste or dye used for printing the adinkra cloth (Amateye, 2009). See figure 2.52.

(Amateye, 2009)

Figure 2. 51: Initial boiling of dye liquor in series of chambers
Figure 2.52: Adinkra paste (‘‘adinkra duro’’) obtained ready for use

Preparation of the Adinkra Stamps and the Screen

The Adinkra stamps are normally high relief carved blocks. The block (stamp) is prepared by:

i. First drawing the adinkra symbol to be printed on gourd or pieces of calabash.

ii. Using a sharp artist’s cutter or chisel to carve out the negative portions of the motif to create a high relief block. The blocks are usually reinforced behind with 3-5 sticks of stiff palm-leaf ribs. These are tied together at one end acting as a handle for easy handling. Refer to figure 2.53 and 2.54.
Figure 2. 53: Carved adinkra stamps

Figure 2. 54 Reinforced stamp to enhance handling
The preparation of the screen for printing adinkra cloth is done by:

i. designing the adinkra design to be printed manually or using a computer.

   In manual designing, the symbols to be printed are first drawn on plain white paper using a pencil. The design is then coated with black ink and later on transferred onto a coated screen in a dark room using a developing box that is equipped with white light and safety light. When a computer is used, the design is printed in black and white before it is being transferred onto a screen.

ii. making a wooden frame a little bigger than the design to be printed using softwood.

iii. stretching organdie (mesh) on the wooden frame using a stapler machine.

iv. mixing potassium dichromate (sensitizer) with a quantity of photo-emulsion or white glue that can cover the whole screen to obtain a sensitising solution.

v. coating the screen with the sensitising solution and allowing it to dry in the darkroom.

vi. pouring kerosene or vegetable oil on the designed paper to make it transparent and placing it on the glass of the developing box.

vii. exposing of the coated screen to the white light for 15-20 minutes.

viii. washing of the screen after developing.

ix. masking of the edges of the screen.
The Actual Adinkra Printing Process

The printing process is done by first stretching the fabric to be printed on a long padded table using board pins. Guidelines are created for proper registration. The design portions of the block (stamp) are then dipped in dye and stamped on the stretched fabric. The stamping (printing) continuous until all the units of repeats are printed. The printed fabric is then dried under the sun to dry. Ironing is done to finish the fabric. See figure 2.55 and 2.56.

Figure 2. 55: Adinkra Printing

Figure 2. 56: Hand stamping motifs on cloth
Due to technology, the use of relief blocks for printing is now increasingly being replaced by silk screen printing technology. It has been observed that, with the inception of silk screen printing, the adinkra printing has been adulterated and silkscreens are now being used to print the designs instead of the calabash blocks. The screen printing is done by placing the screen on the stretched fabric. Printing paste or ink then poured at the reservoir of the screen and a squeegee is used to force the ink through the openings (positive areas) of the screen onto the fabric. Refer to figure 2.57.

![Screen printing adinkra patterns unto cloth](image)

(Atmeye, 2009)

**Figure 2. 57: Screen printing adinkra patterns unto cloth**

### 2.6.5 Embroidery Industry

“Nwomu” is a traditional embroidery cloth manufactured by indigenous Ghanaian artists. It is an innovation that expresses the traditional craftsman’s sense of colour. The fabrics are manufactured by combining two or more
different pattern cloths by means of introducing a hand-stitching or embroidery technically known as faggoting. The embroidery is made in an alternating pattern with colours such as red, yellow, blue, green, and black.

However, due to modernisation and enhancement of aesthetics, the colour arrangements now differ from one textile designer to another. The faggoting method of cloth production is also now gradually being replaced by machine stitching. Woven kente strips with striped patterns similar to the faggoting are now sewn in between the pieces of cloths. Figures 2.58-2.61 show both the faggoting and machine sewing processes and their respective results.

Figure 2.58: Hand embroidery technique (faggoting)
Figure 2. 59 Pieced-up cloth by hand embroidery

Figure 2. 60: Machine sewing pieces together
2.6.6 Smock Industry

A smock is a form of garment worn by male and females, chiefs and ordinary people in the society. The smock industry is located in the Northern part of Ghana. The famous towns and villages in smock production are Tamale and Daboya.

Smock Production Process

The operations of the smock industry involve cotton cultivation, spinning cotton into yarn, dyeing of cotton yarns, weaving and construction of the woven fabrics into a smock. Refer to pages 96 to 109 for processes involving in cotton cultivation, spinning, dyeing of cotton yarns, and weaving. The production of
smock is carried out by individual experts. It is done by hand sewing of the stripes of woven cloth to create the garments. Sewing machines are sometimes used to sew the stripes together to form the garment. The sewing machines are used especially when there are huge orders.

But it was revealed that the hand-produced smocks are of the higher quality and aesthetics than the machine-made ones. This is because the techniques and styles used by hand sewing cannot be done by the machine. The hand sewing also enables smock producers to stitch threads which are thicker for machines to sew. Figure 2.62 and 2.63 show hand sewing of the smock finished smock product.

Figure 2.62: Construction of smock fabric
Figure 2.63: Constructed smock

Sale and Marketing of the Smocks

Products of smock are either by freelance sales or display in market stands. Order sales are also another means of selling smock goods. The goods are also sold in conferences and parties, funeral grounds, weddings and any other social gatherings (Amateye, 2009). Smock trading includes women and men who sell smock like any other commodity in the open market.

2.7 Summary of Gaps in Literature Reviewed

Using the references in this chapter, it is clear that some gaps exist to merit the present study. First of all, the literature reviewed on demographic characteristics
of teachers indicated that there are divergent views of the authors on whether demographic characteristics of teachers influence their pedagogical content knowledge and skills acquisition of the students. The literature reviewed also showed that the influence of demographic characteristics of teachers on their competency is based on general and other vocational subjects (Chokera, 2014).

The literature reviewed on the influence of pedagogical content knowledge of the teachers on the skills acquisition of school graduates concentrated on the other subject teachers’ pedagogical content knowledge on graduates’ skill acquisition. The literature reviewed on the nature of pedagogical strategies used in the classrooms across the world also focused on pedagogical strategies used in the basic school, secondary school and tertiary classrooms but on other subjects such as science, mathematics, business studies and English language.

A few literature also exist on the influence of challenges facing Ghana senior high schools textile training on the operations of the indigenous textile industry. This is the knowledge gap the present study identified to fill.
CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter outlines the research design employed to carry out the study. It explains the research design and provides a justification for its use. The section also discusses the study variables, study location, target population, sampling techniques and sample size. It further discusses instrumentation, piloting, validity, reliability, data collection techniques, data analysis and ethical and logistical considerations.

3.2 Research Design

According to Saunders, Lewis and Thornhill (2012), a research design is a general map of how the researcher intends to go about answering the study questions. It is the structure of research that outlines what the researcher seeks to find out from the study and how he or she will carry out the study (Muzenda, 2014). This study employed a cross-sectional survey design. The cross-sectional design was preferred because it allows a large amount of data to be collected within a short time (Rose, Spinks & Canhoto, 2015).

According to De-Leeuw, Hox and Dillman (2008), a survey is a research design whereby quantitative data is steadily gathered from a relatively large sample obtained from a population. Zheng (2015) states that a cross-sectional survey is a type of research design in which the researcher collects data on only a small
portion of the population to obtain large information about the sampled elements of the population as a whole.

Both quantitative and qualitative data were collected in this study. The quantitative data collected was positive in reporting the demographic data of the respondents and it also offered the researcher an opportunity to test the null hypotheses formulated in order to ascertain the relationship between the independent variables and dependent variables. The qualitative data, on the other hand, enabled the researcher to collect in-depth knowledge about the problem under investigation. The purpose of collecting both quantitative and qualitative data simultaneously is to sustain the strength and improve the limitations of the two designs (Creswell, 2014; Greenwood & Terry, 2012; Truscott, et al. 2010).

### 3.2.1 Variables in the Study

The study focused on three variables namely; independent variables, intervening variables and dependent variables. The independent variables were gender, age, qualification, work experience, pedagogical content knowledge proficiencies of textile teachers, nature of pedagogical strategies used by textile teachers and availability, accessibility and usability of training facilities and resources. The intervening variables were students’ attitude, existence of teachers and students’ motivation, mode of assessment, flexibility in implementation of government and school policy.
Finally, level of school graduates’ participation in the modernisation of the indigenous textile industry was the dependent variable. The three study variables were measured on a categorical and interval scales. Table 3.1 indicates the variables of this study.

Table 3.1: Independent, intervening and dependent variables

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Intervening Variables</th>
<th>Dependent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Gender</td>
<td>i. Students attitude</td>
<td>i. Level of school</td>
</tr>
<tr>
<td>ii. Age</td>
<td>ii. Existence of</td>
<td>graduates’</td>
</tr>
<tr>
<td>iii. Qualification</td>
<td>students &amp; teachers</td>
<td>participation</td>
</tr>
<tr>
<td>iv. Work experience</td>
<td>motivation.</td>
<td>in modernisation</td>
</tr>
<tr>
<td>v. Pedagogical content</td>
<td>iii. Mode of</td>
<td>of indigenous</td>
</tr>
<tr>
<td>knowledge proficiencies</td>
<td>assessment</td>
<td>textile industry.</td>
</tr>
<tr>
<td>vi. Nature of pedagogical</td>
<td>iv. Flexibility of</td>
<td></td>
</tr>
<tr>
<td>strategies used by textile</td>
<td>implementation of</td>
<td></td>
</tr>
<tr>
<td>teachers.</td>
<td>Government &amp; school</td>
<td></td>
</tr>
<tr>
<td>vii. Pedagogical</td>
<td>iv. Flexibility of</td>
<td></td>
</tr>
<tr>
<td>knowledge proficiencies</td>
<td>school policy.</td>
<td></td>
</tr>
<tr>
<td>viii. Availability,</td>
<td>i. Level of school</td>
<td></td>
</tr>
<tr>
<td>accessibility and usability of training facilities/resources.</td>
<td>graduates’ participation in modernisation of indigenous textile industry.</td>
<td></td>
</tr>
</tbody>
</table>

3.2.2 Study Location

The study was conducted in Ghana, a West African nation with a total estimated population of 30.42 million. The landmass of Ghana is virtually the same as the United Kingdom’s (92,099 square miles/238,535 square kilometers), giving the country an overall population density of 313 people per square mile, or 121 people per square kilometer. There are 16 regions (counties) in Ghana. The study was carried out in three regions. These three regions are the Ashanti region,
Volta region, and Northern region. These regions were selected because they are the famous regions in indigenous textile production.

Volta region is located between latitudes 50 45 “N and 80 45” N west to the Republic of Togo. Domestically, the Volta region shares a boundary with Greater Accra region, Oti region and Eastern region. Ho is the capital city of the Volta region. The region has a total land size of about 20,570 square kilometres, representing 8.7 percent of the total land area of Ghana until December 2018 when Oti region was created from it. The Volta region has 17 administrative districts. Volta is a multilingual and multi-ethnic region. The ethnic groups are Ewe and Guan.

The Ashanti region is the third-largest region in Ghana. It is located in the southern part of Ghana. Kumasi is the capital city of the Ashanti region. The Ashanti region occupies a total land surface of 24,389 km2 (9,417 square meter) or 10.2 percent of the total land area of Ghana. In terms of population, however, it is the most populated region with a population of 4,780,380 according to the 2011 census, accounting for 19.4% of Ghana's total population. The Ashanti region has 30 districts made up of 1 Metropolitan, 7 Municipal and 22 districts. It shares boundaries with the Central, Western North, Eastern, Brong Ahafo, Bono East and Ahafo regions. Unlike Volta region, the people of Ashanti region speak one common language known as Akan which is widely spoken by the majority of Ghanaians.
Northern region is located in the northern part of Ghana and it is the largest region in Ghana occupying an area of 70,384 square kilometres or 31 percent of Ghana’s land area until December 2018 when the Savannah and North-East Regions were created from it. Tamale is the regional capital of the Northern region. There is a total of 14 administrative districts in the Northern region currently. Domestically, the Northern region shares boundary with Oti region in the east, Savanna region in the north and North East region in the west.

3.3 Target Population

According to Alvi (2016), a target population is the group of elements to which a researcher intends to obtain his or her data from. Alvi (2016) further states that a target population refers to all the elements who meet the particular condition outlined for a research study. A target population refers to a group of persons with distinctive features in which a researcher wants to study and collect data (Arthur-Nyarko, 2017). The target population is the group of individuals to which the researcher wants to make an inference.

According to Ghana Education Service (2018), there are 126 senior high schools in Ashanti, Volta and Northern regions offering textiles. Out of the 126 schools, 73 of the schools offering textiles are located in Ashanti region, 46 are located in the Volta region and 7 are located in the Northern region. The total population of textile teachers in the three regions was 346 (Ghana Education Service, 2018). This study targeted all the 346 senior high school textile teachers, 6 heads of visual arts department and 12 textile graduates working in the indigenous textile
industry in the three regions targeted. Table 3.2 indicates the breakdown of the groups in the target population.

Table 3.2: Target Population

<table>
<thead>
<tr>
<th>Group</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior High Schools Textile Teachers</td>
<td>346</td>
</tr>
<tr>
<td>Senior High Schools Textile Graduate</td>
<td>12</td>
</tr>
<tr>
<td>Heads of Visual Arts Department</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>364</strong></td>
</tr>
</tbody>
</table>

3.4 **Sampling Techniques and Sample Size**

3.4.1 **Sampling Techniques**

The method by which a sample is obtained from a population is called sampling (Alvi, 2016). In this study, purposive sampling, simple random sampling, and snowball sampling were used to enable the researcher to get relevant information needed for the study. There are numerous senior high schools in the target population but not all of them are offering textiles. The purposive sampling was adopted to select only senior high schools offering the textile programme. Burke and Christensen (2014) state that purposive sampling is a non-probability form of sampling. It is sometimes called judgmental sampling. In purposive sampling, the researchers indicate the features of a population of interest.

There were three hundred and forty-six (346) textile teachers in the three regions targeted. Simple random sampling was used to select the two hundred and twenty-five (225) textile teachers to provide data for this study. The researcher sampled three (3) each in schools where there were four (4) textile teachers and one (1)
each in schools where the textile teachers were two (2). Simple random sampling was used because the researcher could not collect data from all the three hundred and forty-six (346) senior high school textile teachers in the three regions due to the scattered nature of the targeted population for this study. Simple random sampling is a technique in which every subject of the target population has an equal opportunity to be selected (Alvi, 2016).

The Snowball sampling technique was employed to trace senior high school graduates working in the indigenous textile industry in Volta, Ashanti and Northern regions of Ghana to provide relevant information for this study. Snowball sampling was employed because getting information about the location of the textile graduates was difficult for the researcher (Elfil & Negida, 2017; Limboro, 2012).

To trace the textile graduates working in the indigenous textile industry, the researcher asked the first graduate identified to give him access to his colleagues working in the indigenous textile industry. The graduates recommended by the first textile graduate identified also gave the researcher access to other graduates. The process continued until the researcher was able to trace twelve (12) graduates who were still in the indigenous textile manufacturing business.

3.4.2 Sample Size

Sampling was carried out in this study because the target population was a very scattered one and so it was impossible for the researcher to collect data from all
the 346 textile teachers targeted. A sample is a collection of individuals from a
population one is interested to study (Malone & Coyne, 2016). Hill (2012) states
that with a population of 30 to 500, the use of about 10% size of the population
is recommended. Bosibori (2012) indicates that for little populations, a sample
size of about 20% of the population is an excellent representation while for a
huge population, a sample size of 10% representative is adequate.

The researcher, therefore, sampled 50% of the textile teachers' population to
obtain 173. However, the researcher hypothesised that some teachers may not
return their questionnaire and so the sample size for the teachers was 30%
upward adjusted to cater for non-compliance (McConnell & Vera-Hernandez,
2015). The teachers’ sample size for the study was therefore 225. Table 3.3
indicates the breakdown of the total sample size.

Table 3.3: Sampling grid of participants for the study

<table>
<thead>
<tr>
<th>Participants</th>
<th>Population</th>
<th>Percent Sampled</th>
<th>Non-return Percentage Added</th>
<th>Actual Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHS Textile Teachers</td>
<td>346</td>
<td>50%</td>
<td>30%</td>
<td>225</td>
</tr>
<tr>
<td>SHS Textile Graduates</td>
<td>12</td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>HODs</td>
<td>6</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>364</td>
<td></td>
<td></td>
<td>243</td>
</tr>
</tbody>
</table>

3.5 Instrumentation

According to Anum (2017), research instruments are the tools that aid a
researcher to collect his or her data and they include a questionnaire, interview
guides, and observation. Research instruments are what a researcher uses for
collecting information (data) to answer his/her research questions (Kok Eng, 2013). This study used three (3) data collection instruments namely; a questionnaire, interview guide and observation. The questionnaire was deemed imperative because it permitted a large quantity of data to be collected at the same time. Again, the use of the questionnaire allowed for the collection of both quantitative and qualitative data. Interview, observation were used because they enabled the researcher to have in-depth knowledge about the problem.

3.5.1 Questionnaire for Senior High School Textile Teachers

Both closed-ended and open-ended questionnaire were administered to senior high schools textile teachers (Appendix A). The questionnaire for the textile teachers was categorised into sections A, B, C & D. Section A was about their demographic characteristics. The variables engaged were grouped and evaluated on categorical and ordinal scales. Section B was on the influence of pedagogical content knowledge of Ghana senior high school textile teachers on the skills acquisition of school graduates. Section C was on the nature of pedagogical strategies textile teachers used in training their students and section D was about the influence of challenges facing Ghana senior high schools textile training on the operations of the indigenous Ghanaian textile industry.

3.5.2 Interview Schedule for Textile Graduates and Visual Arts Heads of Department

According to Rowley (2012), interviews are face-to-face oral interactions in which one individual, the interviewer, tries to obtain data from and gain
comprehension of other individuals, the interviewee. In a similar mode, Cohen and Manion (2006) observe that an interview is a talk between two or more people that is instigated by the interviewer for the intention of obtaining research data. Fundamentally, interviews aim at amassing wealthy descriptive data that help out the researcher to comprehend the respondent's building of information and societal realities. In this study, interviews were arranged and conducted with Ghana senior high school textile graduates and heads of the visual arts department.

The interview guide for textile graduates (Appendix B) was divided into sections A and B only. Section A was on the influence of pedagogical content knowledge of Ghana senior high school textile teachers on the skills acquisition of school graduates whilst section B was on the challenges facing the operation of the indigenous textile industry.

The interview guide for the heads of visual arts departments in the senior high schools (Appendix C) was divided into section A, B and C. Section A was on the influence of pedagogical content knowledge of textile teachers on the skills acquisition of school graduates whilst section B was on the nature of pedagogical strategies textile teachers used in training their students. Section C was on the challenges facing Ghana senior high school textile training.
3.5.3 Classroom Observation Schedule

In this study, non-participant observation was employed to observe the nature of pedagogical strategies used by senior high school textile teachers in the classroom. The observation schedule was adopted because it assisted the researcher to observe every single activity performed in the classroom. Observation is a mode of collecting raw data by observing activities, actions or making a note of physical features in their natural locale. Kawulich (2005) describes an observation guide as the sequential narrative of activities and artworks in the social setting selected for a study. Observation guide permits a researcher to illustrate live condition using the five sense organs, making available a written photograph of the condition under study (Kawulich, 2005).

Observation is a method in which the researcher records the behaviour patterns of the populations, items and occurrences without communicating with them (Swamy, 2014). There are two types of observation. They include participant observation and non-participant observation. In participant observation, the researcher takes part in all the activities being performed by the participants whilst examining and keeping records in order to experience the occurrence under study (Anum, 2017). On the other hand, in non-participant observation, the researcher only observes and records the activities without any participation (Zohrabi, 2013). Table 3.4 indicates the objectives of the study and the instruments used to measure them.
Table 3.4: Objectives and data collection instruments

<table>
<thead>
<tr>
<th>Research Objectives</th>
<th>Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. To establish the influence of demographic characteristics of Ghana senior high</td>
<td>• Questionnaire</td>
</tr>
<tr>
<td>school textile teachers on school graduates’ participation in the modernisation</td>
<td></td>
</tr>
<tr>
<td>of the indigenous textile industry.</td>
<td></td>
</tr>
<tr>
<td>ii. To establish the influence of pedagogical content knowledge of Ghana senior</td>
<td>• Questionnaire</td>
</tr>
<tr>
<td>high textile teachers on the skills acquisition of school graduates.</td>
<td>• Observation</td>
</tr>
<tr>
<td>iii. To determine the nature of pedagogical strategies used by Ghana senior high</td>
<td>• Questionnaire</td>
</tr>
<tr>
<td>school textile teachers in training their students.</td>
<td>• Interview guide</td>
</tr>
<tr>
<td>• Observation checklist</td>
<td></td>
</tr>
<tr>
<td>iv. To determine the influence of challenges facing Ghana senior high school textile</td>
<td>• Questionnaires</td>
</tr>
<tr>
<td>training on the operations of indigenous textile industry.</td>
<td>• Interview guide</td>
</tr>
</tbody>
</table>

3.6 Piloting

Ismail, Kinchin and Ewards (2017) posit that a pilot study is a trivial study carried out in preparation for the final full-scale research. Ismail, Kinchin and Ewards (2017) continue that a pilot study aids researchers to test in reality how likely the research process is to work, so as to enable them to resolve how best to carry out the final study. To ascertain the quality of the questionnaire used in this study in terms of reliability, a pilot study (Appendix L) was done.
Also, to guarantee that the data collected were appropriate, pre-testing was done to determine the quality of the instruments in terms of the minutes taken to fill the questionnaire, identify commonly misinterpreted items on the questionnaire (Creswell, 2012). My supervisors who are experts in this study area critically assessed the draft instruments to ensure the validity of the instruments. Thirty (30) textile teachers who met the criteria to be sampled but were excluded from the final sample were given the questionnaire to fill.

The respondents were asked to feel free and comment on any grammatical errors found in the questionnaire and this has resulted in slight changes of words and sentences in the questionnaire. The pre-testing has also led to the removal of some items in the questionnaire which could post a problem during the main data collection. The elimination of inappropriate items and ambiguous wording has improved the validity of the questionnaire. According to Dikko (2016), pre-testing is described as a tryout of research instruments carried out in preparation of a full-scale study and may be performed purposely to try a research tool.

Also, the interview guide for textile graduates was tried on 2 graduates working in the indigenous textile industry. Again, the interview schedule for heads of the visual arts department was pre-tested on 1 head of the visual arts department. The people involved in the pre-testing of the interview guide were not included in the main study. During the pre-testing of the interview guides, the researcher took note of information the interviewees gave and also recorded conversations after seeking permission from the interviewees.
3.7 Validity and Reliability of the Instruments

3.7.1 Validity of the Instruments

The validity of the research tools was carried out in this study to verify the accuracy of the data collection instruments in the course of the pre-testing study. Content, and face validity were employed in this study. The content validity was carried out by developing the research instrument after a review of related literature. This was followed by the reviewed of the instruments by an expert in this study area. Face validity is the outward look of a measuring research instrument (Arthur-Nyarko, 2017). Face validity was carried out to ensure that the instruments used were ambiguity free. To ensure face validity, the items on the questionnaire were stated short, brief and well-organised in order to advantage respondents’ acceptability and motivation.

According to Ghazali (2016), validity is the capability of the research tool to quantify what is assumed to assess. Validity is the use of certain steps to check for the precision of the research results (Creswell, 2014). Validity is described as the extent to which a theory is perfectly measured in a quantitative study (Heale & Twycross, 2017). According to Ndayimirije (2015), the purpose of validity is to confirm that the research tools are testing elements in line with the research objectives and what is set to be investigated.

3.7.2 Reliability of the Instruments

Reliability refers to the capacity of a research tool to continuously give similar results throughout numerous utilisations (Bosibori, 2012). The purpose of
reliability is to confirm that a tool is testing elements in line with the research objectives. In this study, the internal consistency reliability technique through the use of Cronbach coefficient alpha was employed to assess the reliability of the questionnaire. According to Arthur-Nyarko (2017), internal consistency is the degree to which items that constitute the scale measure the same central attributes. The internal consistency is done by grouping items that measure the same concept on the questionnaire. Cronbach coefficient alpha is the most commonly used method for testing internal consistency (Arthur-Nyarko, 2017). It shows how items of the scale correlate among themselves. The coefficient alpha ranges between zero (0) and one (1). The closer the coefficient alpha is to 1, the better the reliability of the instruments and vice versa (Trochim, 2006).

To evaluate the reliability of the questionnaire, Statistical Package for Social Sciences (SPSS) software version 21 was used to analyse the data obtained from thirty (30) textile teachers who took part in the pilot study. After the analysis, the Cronbach coefficient alpha yielded a value of 0.88 (Appendix M). The findings are in support with (Arthur-Nyarko, 2017) who states that a coefficient alpha value of 0.7 or higher is considered as good enough for internal consistency reliability with a minimum of 0.6 and a maximum of 0.96. This made the questionnaire used in the pilot study very appropriate for use in the main study. Careful recording of the interview conducted with two (2) textile graduates and one (1) HOD of visual arts department who qualified to be sampled, but were not included in the final sample and verbatim transcription of
the recorded data also ensured that the reliability of the interview schedules was attained.

3.8 Data Collection Techniques

The instruments used for data collection were a questionnaire, interview guide and non-participant observation. First of all, for the researcher to meet the logistical concerns of the study and to make sure that ethical issues were addressed, the researcher started the data collection procedure by collecting proposal approval letter from the Dean of Graduate School, Kenyatta University, after the Board of Graduate School approval of the proposal (Appendix F). The researcher then wrote a permission letter and attached a copy of Kenyatta University Graduate School research approval letter to the Director-General, Ghana Education Service, Accra, Ghana (Appendix G) in order to obtain a research permit. The letter was forwarded to the Director of Senior High Schools Division at Ghana Education Service Accra to give the approval.

The researcher finally obtained the research permit (Appendix H) from the Director of Senior High Schools Division to collect data from the selected senior high schools in the target population. Copies of the research permit obtained from Ghana Education Service headquarters were presented to heads of senior high schools in the target population to seek permission to collect data. The researcher trained 4 research assistants in each region that helped to explain how to fill the questionnaire and the purpose of the study. The questionnaire was distributed to textile teachers with the help of the research assistants that were
trained in each region. The number of copies of the questionnaire issued out varied from place to place depending on the accessible population available.

At the indigenous textile industry where senior high school textile graduates were working, the researcher introduced himself to the managers, presented his research approval letter from Kenyatta University to them in order to be permitted to conduct the interview with the textile graduates. Prior to the interview, the researcher visited the interviewee in order to:

i. seek their consent.

ii. explain the motive of the research to him/her.

iii. seek for an appointment date and time.

The interview guide was sent to the interviewee for him/her to prepare. Permission was sought from the interviewee to record the conversation during the time of the interview with textile graduates. Interviewees were interviewed in their workplaces. The researcher also attended classes during textile lessons to obtain data on the nature of pedagogical strategies used by textile teachers in transmitting skills textile graduates needed to modernise the indigenous textile industry.

3.9 Data Analysis and Presentation

The data collected were analysed quantitatively and qualitatively to address the objectives of the study. Descriptive and inferential statistics were employed in quantitative data analysis. The descriptive statistics were used to summarise,
organise and describe the responses through the use of pie charts, tables and bar charts. The inferential statistics such as a one-way-analysis of variance (ANOVA) and point-biserial correlation, were used to test the formulated null hypotheses. The aim of using the inferential statistical tools employed in this study was based on the type of hypotheses tested. The analyses were carried out in the following order:

i. **Analysis of objective one and hypothesis one**: To establish the influence of demographic characteristics of Ghana senior high school textile teachers on school graduates participation in the modernisation of the indigenous textile industry (gender, age group, educational level & work experience) was analysed using the parametric test such as percentages, frequency count of the responses. The null hypothesis one (there is no statistically significant relationship between Ghana senior high schools textile teachers’ demographic characteristics and school graduates participation in the modernisation of the indigenous textile industry) was tested using a one-way-analysis of variance (ANOVA) and point-biserial correlation. All hypotheses were tested at p < 0.05 alpha level of significance.

ii. **Analysis of objective two and hypothesis two**: to establish the influence of pedagogical content knowledge of Ghana senior high textile teachers on the skills acquisition of school graduates (I communicate clearly in the language of instruction orally and in writing, I have adequate textile practical skills to help my students modernise the indigenous textile industry, I am competent in the use of practical
tools/equipment and materials used for indigenous textile production, I have an in-depth knowledge and skills on CAD/ CAM usage. Textile teachers with adequate content knowledge can help the textile graduates modernise the indigenous textile industry and the use of appropriate pedagogical strategies can help modernise the indigenous textile industry) was analysed using descriptive statistics such as such percentages and a frequency count of the responses. The null hypothesis two (there is no statistically significant relationship between pedagogical content knowledge of Ghana senior high textile teachers and the skills acquisition of school graduates) was tested using point-biserial correlation.

iii. Analysis of objective three and hypothesis three: to determine the nature of pedagogical strategies used by Ghana senior high school textile teachers in training their students (lecture, discussion, demonstration, project field trip & work-based) was analysed using descriptive statistics such as such percentages, a frequency count of the responses. The null hypothesis three (there is no statistically significant relationship between the nature of pedagogical strategies used by Ghana senior high school textile teachers and school graduates’ participation in the modernisation of the indigenous textile industry) was tested using point-biserial correlation.

iv. Analysis of objective four and hypothesis three: to determine the influence of challenges facing Ghana senior high schools textile training on the operations of indigenous textile industry (my school has a well-
equipped ICT lab for textile CAD/CAM training needed to modernise the indigenous textile industry, my school authorities supply materials for practicals, my school has enough textile tools and equipment used in the indigenous industry, there are enough published textile textbooks in the system, my school has a permanent and well-equipped textile studio for practical works, the time and the number of periods allotted to textile programme is sufficient for practical works and I attend organised workshop and industrial attachment periodically to update my skills) was analysed using the parametric test such as percentages, a frequency count of the responses. The null hypothesis four (the challenges facing Ghana senior high schools textile training have no statistically significant influence on the operations of the indigenous textile industry) was also tested using point-biserial correlation.

Apart from demographic data, most of the quantitative data in the questionnaire were obtained on a 5-point Likert scale that ranged from Strongly Agree to Strongly Disagree. The Strongly Agree (SA) and Agree (A) categories were integrated into an Agree group, whilst the Strongly Disagree (SD) and Disagree (D) were added to form a Disagree Category. The not sure category was maintained. The interview guides and observation data were transliterated to create records. The write out of raw information was coded by hand under the various themes. The information was matched up and grouped in accordance with resemblances so as to develop categories. Table 3.5 summarises research objectives/hypotheses and measuring statistical tools.
### Table 3.5: Objectives & hypotheses and measuring statistical tools

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Hypotheses</th>
<th>Statistical Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. To establish the influence of demographic characteristics of Ghana senior high school textile teachers on school graduates participation in modernisation of indigenous textile industry.</td>
<td><strong>H₀₁:</strong> There is no statistically significant relationship between Ghana senior high schools textile teachers’ demographic characteristics and school graduates participation in the modernisation of the indigenous textile industry.</td>
<td>Frequency count &amp; percentages.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>One-way ANOVA, Point-Biserial Correlation</td>
</tr>
<tr>
<td>ii. To establish the influence of pedagogical content knowledge of Ghana senior high textile teachers on the skills acquisition of school graduates.</td>
<td><strong>H₀₂:</strong> There is no statistically significant relationship between textile teachers’ pedagogical content knowledge and skills acquisition of Ghana senior high school graduates.</td>
<td>Frequency count and percentages.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Point-Biserial Correlation</td>
</tr>
<tr>
<td>iii. To determine the nature of pedagogical strategies used by Ghana senior high school textile teachers in training their students.</td>
<td><strong>H₀₃:</strong> There is no statistically significant relationship between the nature of pedagogical strategies used by Ghana senior high school textile teachers and school graduates’ participation in the modernisation of the indigenous textile industry.</td>
<td>Frequency count and percentages.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv. To determine the influence of challenges facing Ghana senior high schools textile training on the operations of indigenous textile industry.</td>
<td><strong>H₀₄:</strong> The challenges facing Ghana senior high school textile training have no statistically significant influence on the operations of the indigenous textile industry.</td>
<td>Frequency count and percentages.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Point-Biserial Correlation</td>
</tr>
</tbody>
</table>
3.10 Ethical and Logistical Consideration

Twum (2013) indicates that we have four (4) phases in research principles, namely; preparation, data collection, processing and analysis of data collected and reporting of the outcome. The researcher obtained an approval letter from the Graduate School, Kenyatta University. The researcher obtained a research permit from the Ghana Education Service (GES). Copies of the research permit were presented to heads of senior high schools to seek permission to collect data.

At the indigenous textile industry, the researcher introduced himself to the managers, presented his research approval letter from Kenyatta University to them in order to be permitted to conduct an interview with the textile graduates. During the data collection stage, the interviewer limited himself to questions outline in the interview guide but left room for flexibility. The respondents also had the chance to complete the questionnaire confidentially in order to warrant privacy.

3.11 Summary of the Chapter

The research design employed in this study was a cross-sectional survey design. Both quantitative and qualitative data were amassed in this study. Data was collected from Ghana senior high school textile teachers, graduates and heads of the visual arts department. The sampling techniques employed were purposive sampling, simple random sampling and snowball sampling. The total sample size for the study was 243 (including 225 textile teachers, 12 textile graduates and 6 HODs). The research instruments used for data collection were non-participant
observation, questionnaire for textile teachers, and interview guides for textile graduates and HODs of the visual arts department. A pilot study was done on 30 textile teachers, 2 textile graduates and 1 HOD who qualified to be sampled but were not included in the final study to ensure the reliability of the instruments used in the study.
CHAPTER FOUR
PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This study focused on the influence of textile teachers’ pedagogical content knowledge on senior high school graduates’ participation in the modernisation of the indigenous textile industry. The chapter presents a chronological analysis of both quantitative and qualitative data, interpretation and discussion in relation to research objectives and hypotheses. The quantitative data analysis began with a descriptive analysis followed by inferential statistics that are meant to test the null hypotheses formulated to guide the study.

The chapter also presents the analyses of qualitative data collected by using an open-ended questionnaire, the interview guide and non-participant observation under the various themes. The discussion of the findings makes references to studies that substantiate or contradict the findings. The current study addressed the following specific objectives:

i. To establish the influence of demographic characteristics of Ghana senior high schools textile teachers on school graduates’ participation in the modernisation of the indigenous textile industry.

ii. To establish the influence of pedagogical content knowledge of Ghana senior high schools textile teachers on the skills acquisition of school graduates.
iii. To determine the nature of pedagogical strategies used by Ghana senior high schools textile teachers in training their students.

iv. To determine the influence of challenges facing Ghana senior high schools textile training on the operations of the indigenous textile industry.

v. To develop a model for the modernisation of the indigenous Ghanaian textile industry based on the findings of the study.

The study tested the following null hypotheses formulated to achieve the objectives of the study:

i. $H_01$: There is no statistically significant relationship between Ghana senior high schools textile teachers’ demographic characteristics and school graduates participation in the modernisation of the indigenous textile industry.

ii. $H_02$: There is no statistically significant relationship between textile teachers’ pedagogical content knowledge and skills acquisition of Ghana senior high school graduates.

iii. $H_03$: There is no statistically significant relationship between the nature of pedagogical strategies used by Ghana senior high school textile teachers and school graduates’ participation in the modernisation of the indigenous textile industry.

iv. $H_04$: The challenges facing Ghana senior high school textile training have no statistically significant influence on the operations of the indigenous textile.
4.2 General Information

This section provides a questionnaire return rate of Ghana senior high school textile teachers.

4.2.1 Questionnaire Return-Rate of Textile Teachers

The questionnaire was the main instrument used for data collection in this study. A total of two hundred and twenty-five (225) questionnaire were administered to senior high school textile teachers. In the Ashanti region, one hundred and twenty-six (126) questionnaire were administered, seventy-eight (78) were administered in the Volta region and twenty-one (21) were administered in the Northern region. The distribution was done based on the accessible population. Out of the two hundred and twenty five (225) questionnaire administered, (92.9%) were retrieved whilst (7.1%) were not return.

However, 3 of the questionnaire retrieved were not properly filled and so the two hundred and six (206) accurately filled questionnaire were analysed using SPSS version 21. This high rate of return was due to good planning of the data collection procedure as suggested by (Cohen et al., 2007) that it is important to plan for good response rates by indicating how and when the questionnaire will be returned. Figure 4.1 shows the questionnaire return rate of the textile teachers.
Figure 4.1: Questionnaire returned-rate of textile teachers

4.3 Influence of demographic characteristics of Ghana senior high school textile teachers on school graduates’ participation in the modernisation of the indigenous textile industry

The first objective of the study was to establish the influence of demographic characteristics of Ghana senior high school textile teachers on school graduates’ participation in the modernisation of the indigenous textile industry. To achieve this objective, both descriptive and inferential statistical analyses were done. The purpose of obtaining the demographic data of the textile teachers was to find out if demographic variables influence their subject matter delivery and the kind of pedagogical strategies they used in training their students. Understanding this
information was imperative since it had the possibility of influencing the findings of the study.

The textile teachers’ demographic characteristics included gender, age, qualification and teaching experience. The textile teachers’ gender was to establish if male and female teachers vary significantly with their pedagogical content knowledge competencies. The gender was also to establish which sex is dominating with regard to textile training in Ghana senior high schools. The age group of the textile teachers was to establish whether their age groups influence their pedagogical content knowledge competencies. The textile teachers’ qualification was to ascertain if their level of education influences their pedagogical content knowledge competencies while teaching experience was to establish if the number of years teaching textiles influences their pedagogical content knowledge competencies.

4.3.1 Descriptive Data Analysis

Findings on textile teachers’ gender indicate that the majority of them (78.6%) were male while (21.4%) were female. This shows that the study of textile is still viewed as men domain because, in Ghana, there is a division of labour among sexes. The disaggregating data about gender in this study is essential, particularly when making findings on which gender is in the majority or if there is a significant positive relationship between textile teachers’ gender and their pedagogical content knowledge competencies. Figure 4.2 shows the gender of textile teachers.
The findings on the age of textile teachers’ show that the majority of them (54.9%) were between 31-40 years whilst (21.4%) were between 20-30 years. Also, (18.9%) of textile teachers were between 41-50 years while (4.8%) were aged between 51 years and above. Figure 4.3 shows the age group of textile teachers.
The findings on textile teachers’ qualifications show that a higher number of them (35.9%) had a bachelor of technology qualification, while (25.3%) were a bachelor of education degree holders. Others (19.9%) were HND holders and (18.9 %) had a master of education qualification. The data show that (55.8%) of the teachers were not qualified to teach in Ghana senior high schools since they had only HND as their highest qualification or bachelor degree without education background. Figure 4.4 indicates textile teachers’ qualifications.
The results on the work experience of the textile teachers reveal that (46.1%) of them had been teaching textiles between 6-10 years, (25.2%) had been teaching for 1-5 years, while (17.1%) had been teaching between 11-15 years. The rest (9.2%) had been teaching textile between 16-20 years and (2.4%) had been teaching for over 20 years. Figure 4.5 indicates the teaching experience of textile teachers.
4.3.2 Hypothesis Testing

To establish if the demographic characteristics of Ghana senior high school textile teachers have a significant relationship on school graduates' participation in the modernisation of the indigenous textile industry, a set of sub-null hypotheses were formulated from $H_01$. The $H_01$ and sub-null hypotheses were as follows:

$H_01$: There is no statistically significant relationship between Ghana senior high schools textile teachers’ demographic characteristics and school graduates participation in the modernisation of the indigenous textile industry.
i. $H_{01.1}$: There is no statistically significant relationship between textile teachers’ gender and senior high school graduates’ participation in the modernisation of the indigenous textile industry.

ii. $H_{01.2}$: There is no statistically significant relationship between textile teachers’ age and senior high school graduates’ participation in the modernisation of the indigenous textile industry.

iii. $H_{01.3}$: There is no statistically significant relationship between textile teachers’ qualification and senior high school graduates’ participation in the modernisation of the indigenous textile industry.

iv. $H_{01.4}$: There is no statistically significant relationship between textile teachers’ teaching experience and senior high school graduates’ participation in the modernisation of the indigenous textile industry.

Pearson’s point-biserial correlation is a statistical tool that is used to test the relationship between a variable that is divided into two parts (dichotomous) and a continuous variable which is comparable to the Pearson product-moment correlation coefficient (Newsom, 2013). To use Pearson’s point-biserial correlation, the demographic variables of the textile teachers such as gender and qualification were transformed and dichotomously coded as indicated in Table 4.1. For example, gender that was originally coded as 1 for male and 2 for the female was re-coded as 1 for male and 0 for the female. This transformed them into binary variables to enable the researcher to use the point-biserial correlation to test the relationship between the independent variables and the dependent variables.
Table 4.1: Dichotomously Coding Variables

<table>
<thead>
<tr>
<th>Code</th>
<th>Variable</th>
<th>Code</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>0</td>
<td>Female</td>
</tr>
<tr>
<td>1</td>
<td>Undergraduate</td>
<td>0</td>
<td>Graduate</td>
</tr>
</tbody>
</table>

The sub-null hypotheses ($H_{0.1.1}$, $H_{0.1.2}$, $H_{0.1.3}$, & $H_{0.1.4}$) sought to find out whether the demographic characteristics of the Ghana senior high schools textile teachers had a significant influence on school graduates’ participation in the modernisation of the indigenous textile industry. Pearson’s point-biserial correlation coefficient was used to study the relationship between the independent variable (gender) and the dependent variable (school graduates participation in the modernisation of the indigenous textile industry). The results are presented in Table 4.2.

Table 4.2: Point-biserial results on textile teachers’ gender and the modernisation of the indigenous textile industry

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation ($r$)</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>.790**</td>
<td>.001</td>
</tr>
</tbody>
</table>

** Correlation is significant at 0.01 level (2-tailed). $N=206$ **

The results in Table 4.2 revealed a significant relationship between textile teachers’ gender and senior high school graduates’ participation in the modernisation of the indigenous textile industry ($rpb=.790$, n=206, $p=.001$, $R^2=0.001$). The sub-null hypothesis ($H_{0.1.1}$) that states there is no statistically significant relationship between textile teachers’ gender and senior high school graduates’ participation in the modernisation of the indigenous textile industry was rejected because the point-biserial correlation coefficient of $rpb=.790$ and
the \(p\)-value (.001) being less than the significance level (0.05) showed that there was a statistically significant relationship between textile teachers' gender and senior high school graduates' participation in the modernisation of the indigenous textile industry. The study therefore, concluded that, the gender of Ghana senior high schools textile teachers’ had a statistically significant influence on senior high school graduates’ participation in the modernisation of the indigenous textile industry.

The current findings agreed with the findings of Kónya, Matić and Pavlović (2016) who state that gender has a high influence on workers’ organisational obligation because some studies discovered that women are more dedicated to their jobs, other studies established that men are more committed to their jobs than women. The findings are also in agreement with Ismail, Nopiah and Rasul (2017) who state that teachers’ gender has effects on their competency and skills of teachers affect the performance of students they produce and are a vital part of the skill training institution.

The findings of this study are also in support of the findings of (Knight & Elliot, 2009; Komur, 2010; Kleickmann et al., 2012) who opine that teachers’ gender is one of the driving forces behind effective teaching and learning. However, the present finding is not in line with the finding of (Igberadja, 2016) who noted that teachers’ gender has no influence on their competency in the labour market.
The sub-null hypothesis ($H_{0.2}$) relating to the influence of textile teachers’ demographic variables on school graduates participation in the modernisation of the indigenous textile industry was tested using a one-way ANOVA. This statistical tool was used because the independent variables involved had more than three levels. The sub-null hypothesis ($H_{0.2}$) was tested to ascertain if the group means were equal at 0.05 level of significance. Table 4.3 shows the results.

**Table 4.3: One-way ANOVA results on textile teachers’ age and the modernisation of indigenous textile industry**

<table>
<thead>
<tr>
<th>Age</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>27.523</td>
<td>3</td>
<td>9.174</td>
<td>.001</td>
</tr>
<tr>
<td>Within Groups</td>
<td>22.035</td>
<td>202</td>
<td>.109</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>49.558</strong></td>
<td><strong>205</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3 illustrates the one-way ANOVA results which established the relationship between textile teachers’ age and senior high school graduates’ participation in the modernisation of the indigenous textile industry. The findings showed that there was statistically significant mean difference between the groups, $F (202) = 9.174$ $p = .01$, $\alpha = .05$ where $p<0.05$. Therefore, the sub-null hypothesis ($H_{0.2}$) that states there is no statistically significant relationship between textile teachers’ age and senior high school graduates’ participation in the modernisation of the indigenous textile industry was rejected. The study, therefore, concluded that the textile teachers’ age had a statistically significant relationship on senior high school graduates’ participation in the modernisation of the indigenous textile industry.
The current study is in agreement with Armstrong (2015) who suggests that younger teachers are better able to engage and build a relationship with their students because they are closer in age to students and because successful teaching requires high levels of energy. This present study is also in support of Education Forum (2006) which states that younger teachers are also likely to be more conversant with the current curriculum and the content they are required to teach.

Pearson’s point-biserial correlation coefficient was used to test \( H_{01.3} \) which was intended to test the relationship between textile teachers’ qualification and school graduates’ participation in the modernisation of the indigenous textile industry. The results are presented in Table 4.4.

**Table 4.4: Point-biserial results on textile teachers’ qualification and the modernisation of indigenous textile industry**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation (( r ))</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualification</td>
<td>.789**</td>
<td>.001</td>
</tr>
</tbody>
</table>

**Correlation is significant at 0.01 level (2-tailed). \( N=206 \)**

The sub-null hypothesis \( H_{01.3} \) intended to investigate if there was a statistically significant relationship between textile teachers’ qualification and senior high school graduates’ participation in the modernisation of the indigenous textile industry. The sub-null hypothesis \( H_{01.3} \) was tested at the 0.05 significance level using point-biserial correlation. The findings as shown in Table 4.4 indicated that there was a statistically significant relationship between textile teachers’ qualification and senior high school graduates’ participation in the
modernisation of the indigenous textile industry \((rpb = .789, n=206, p=.001, R^2 =0.001)\). The sub-null hypothesis \((H_{0.3})\) was therefore rejected because the findings of the point-biserial correlation coefficient of \(rpb = .789\) with a \(p\)-value being less than 0.05 level of significance suggested a significant relationship between the two variables. This study, therefore, concluded that textile teachers’ qualification had a statistically significant relationship with senior high school graduates’ participation in the modernisation of the indigenous textile industry.

These findings are in line with Yusuf and Adigun (2010) who are of the view that teachers with a professional teaching qualification in Education such as B.Ed., B.A Ed., B.sc Ed., M. Ed., M.A Ed. and M.sc Ed. are more competent than those without teaching qualifications. This implies that teachers’ qualification has a significant influence on their competencies. The current findings also conform to the findings of Kónya, Matić, and Pavlović, (2016) who state that teachers with higher education and professional qualifications often have solid desires for teaching and so they are always committed to the values of the institution so as to achieve the aims of the institution, therefore attaining their own objectives as well.

The sub-null hypothesis \((H_{0.4})\) was tested using a one-way ANOVA. The results are illustrated in Table 4.5.
The One-way ANOVA results in Table 4.5 establish that there was a significant relationship between textile teachers’ teaching experience and senior high school graduates’ participation in the modernisation of the indigenous textile industry, F (201) = 7.169, p =.001, α =.05 where p<0.05. The sub-null hypothesis that states there is no statistically significant relationship between textile teachers’ teaching experience and senior high school graduates’ participation in the modernisation of the indigenous textile industry was therefore rejected. The present study, therefore, concluded that textile teachers teaching experience had a statistically significant influence on senior high school graduates’ participation in the modernisation of the indigenous textile industry.

The current findings are in line with Kiptum (2016), who opines that learners imparted by teachers with several years of teaching experience are more competent than teachers with less experience. The present findings are also in support of Yusuf and Adigun (2010) who state that teachers with 6-15years of teaching experience are more competent than teachers with 1-5years experience. This is an indication that teachers’ years of experience is a measure of quality. The findings are again in support of Kini and Podolsky (2016) who state that
teaching experience is positively related to teachers’ competencies and their students’ performance in the job market throughout a teacher’s career.

4.4 Influence of Pedagogical Content Knowledge of Ghana Senior High Schools Textile Teachers on the Skills Acquisition of Textile Graduates

The second objective of this study was to establish the influence of pedagogical content knowledge Ghana senior high school textile teachers on the skills acquisition of textile school graduates. To achieve this objective, the researcher first carried out descriptive and inferential statistics analysis then followed by qualitative data analysis.

4.4.1 Descriptive Data Analysis

The pedagogical content knowledge of textile teachers is very vital because they can influence the knowledge and skills school graduates required to modernise the indigenous textile industry. Textile teachers were asked to indicate their level of agreement or disagreement to statements. The results of textile teachers’ responses are indicated in Table 4.6.
Table 4.6: Influence of pedagogical content knowledge of textile teachers on the skills acquisition of textile graduates

<table>
<thead>
<tr>
<th>Statement</th>
<th>Agreed</th>
<th>Not Sure</th>
<th>Disagreed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I communicate clearly in the language of instruction orally and in writing.</td>
<td>206 (100%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. I have adequate textile Practical skills to help my students modernise the indigenous textile industry.</td>
<td>88 (42.7%)</td>
<td>-</td>
<td>118 (57.2%)</td>
</tr>
<tr>
<td>3. I use appropriate teaching aids during teaching.</td>
<td>78 (37.9%)</td>
<td>-</td>
<td>128 (62.1%)</td>
</tr>
<tr>
<td>4. I use modern vocational pedagogical strategies during teaching to help my students acquire the knowledge and skills they needed to modernise the indigenous textile industry.</td>
<td>67 (32.6%)</td>
<td>-</td>
<td>139 (67.4%)</td>
</tr>
<tr>
<td>5. I have an in-depth knowledge and skills on CAD/CAM usage.</td>
<td>101 (49.1%)</td>
<td>-</td>
<td>105 (50.9%)</td>
</tr>
<tr>
<td>6. Textile teachers with adequate content knowledge can help the school graduates modernise the indigenous textile industry.</td>
<td>153 (74.3%)</td>
<td>23 (11.2%)</td>
<td>30 (14.5%)</td>
</tr>
<tr>
<td>7. The use of appropriate pedagogical strategies can help school graduate modernise the indigenous textile industry.</td>
<td>175 (84.9%)</td>
<td>5 (2.4%)</td>
<td>26 (12.7%)</td>
</tr>
</tbody>
</table>
In Table 4.6, all the teachers (100%) agreed that they communicate clearly in the language of instruction orally and writing. The information in Table 4.6 also indicates that (57.3%) of textile teachers had no adequate textile manufacturing skills to assist the school graduates to modernise the indigenous textile industry while a few numbers (42.7%) said they have adequate practical skills to deliver. The results in Table 4.6 further reveal that (62.1%) of the textile teachers never used appropriate teaching aids during teaching whilst (37.9%) of teachers used.

The results on the use of modern vocational skills pedagogical strategies during teaching showed that (67.4%) of the textile teachers were not using appropriate vocational skills pedagogical strategies while (32.6%) were found to be using relevant pedagogical strategies to teach the students. Response on textile teachers’ in-depth knowledge and skills on CAD/CAM usage indicated that (50.9%) of them had no in-depth knowledge and skills on CAD/CAM usage while (49.1%) had knowledge and skills on CAD/CAM utilisation. The findings showed that though textile teachers specialised in the subject, the majority of them lacked both content and pedagogical strategies to handle the subject effectively.

From Table 4.6, the majority of the teachers (74.3%) agreed that textile teachers with adequate pedagogical content knowledge can help the school graduates modernise the indigenous textile industry while (14.5%) disagreed with the statement. (11.2%) were not sure of the statement. Most of the textile teachers (84.9%) asserted that the use of appropriate pedagogical strategies can help
modernise the indigenous textile industry while (12.7%) disagreed with the statement. Fewer numbers (2.4%) were not sure of the statement.

4.4.2 Hypothesis Testing

To establish the relationship between the pedagogical content knowledge of Ghana senior high textile teachers and the skills acquisition of school graduates, a set of sub-null hypotheses were formulated from $H_0.2$. The null hypothesis two and sub-null hypotheses were as follows:

$H_0.2$: There is no statistically significant relationship between textile teachers’ pedagogical content knowledge and skills acquisition of Ghana senior high school graduates.

i. $H_{0.2.1}$: There is no statistically significant relationship between textile manufacturing skills of textile teachers and the skills acquisition of school graduates.

ii. $H_{0.2.2}$: There is no statistically significant relationship between textile teachers’ use of appropriate teaching aids and the skills acquisition of school graduates.

iii. $H_{0.2.3}$: There is no statistically significant relationship between textile teachers’ in-depth knowledge and skills on CAD/CAM usage and the skills acquisition of school graduates.

Pearson’s point-biserial correlation coefficient was used to test the sub-null hypothesis ($H_{0.2.1}$) which was proposed to find out if there is a statistically significant relationship between textile manufacturing skills of textile teachers
and the skills acquisition of school graduates. The results are presented in Table 4.7.

**Table 4.7: Point-Biserial Results on Practical Skills of Textile Teachers and Graduates Skills Acquisition**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation (r)</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H_{02.1}$: There is no statistically significant relationship between textile manufacturing skills of textile teachers and the skills acquisition of school graduates.</td>
<td>.742**</td>
<td>.001</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed). N= 206**

In Table 4.7 are the results obtained from the test conducted using Pearson’s point-biserial correlation analysis. The findings indicated that there was statistically significant relationship between textile manufacturing skills of textile teachers and the skills acquisition of school graduates ($r = .742, n=206, p =.01$). The findings further showed that the relationship was strong and significant even at 0.01 level. The sub-null hypothesis ($H_{02.1}$) that states there is no statistically significant relationship between textile manufacturing skills of textile teachers and the skills acquisition of school graduates was rejected and the study concluded that there was a positive statistically significant relationship between textile manufacturing skills of textile teachers and the skills acquisition of school graduates.

In correlation research, a relationship between two variables could either be positive or negative. A positive relationship means that as one variable increases, the other variable also increases while a negative relationship indicates that as one variable increases, the other decreases. In this regard, a positive relationship
coefficient \( r = 0.742 \) recorded means the higher the skills acquired by the textile graduates, the more modernised the indigenous textile industry will become.

The results in Table 4.8 was analysed using Pearson's point-biserial correlation coefficient to ascertain if there is a statistically significant relationship between textile teachers’ use of appropriate teaching aids and the skills acquisition of school graduates or not.

Table 4.8: Point-biserial results on textile teachers’ use of modern vocational skills pedagogical strategies and skills acquisition of school graduates

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation ( r )</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( H_{0.2.2} ): There is no statistically</td>
<td></td>
<td></td>
</tr>
<tr>
<td>significant relationship between</td>
<td></td>
<td></td>
</tr>
<tr>
<td>textile teachers’ use of appropriate</td>
<td>0.808**</td>
<td>.001</td>
</tr>
<tr>
<td>teaching aids and the skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>acquisition of school graduates.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed). \( N = 206 \)

It is indicated in Table 4.8 that, there was a statistically significant relationship between the textile teachers' use of appropriate teaching aids and the skills acquisition of school graduates \( (r = .808, n = 206, p = .01) \). Therefore, the null hypothesis \( (H_{0.2.2}) \) that states there is no statistically significant relationship between textile teachers’ use of appropriate teaching aids and the skills acquisition of school graduates was rejected at 0.05 alpha level of significance.

To test the sub-null hypothesis \( (H_{0.2.3}) \), the data were subjected to Pearson’s point-biserial correlation analysis. The results are presented in Table 4.9.
Table 4.9: Point-biserial results on skills of textile teachers in CAD/CAM usage and the skills acquisition of school graduates

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation (r)</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( H_0 ): There is no significantly positive relationship between textile teachers’ in-depth knowledge and skills on CAD/CAM usage and the skills acquisition of textile school graduates.</td>
<td>.872**</td>
<td>.001</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed). N= 206

As illustrated in Table 4.9, the findings revealed a significant relationship between textile teachers’ in-depth knowledge and skills on CAD/CAM usage and the skills acquisition of textile school graduates \( (r = .872, n = 206, p = .01) \). The value of the relationship coefficient \( (r) \) showed a moderate but significant relationship between the two variables. The sub-null hypothesis \( (H_0) \) was, therefore, rejected and the conclusion was that textile teachers’ in-depth knowledge and skills on CAD/CAM usage had a significant relationship on the skills acquisition of school graduates.

4.4.3 Discussion of the Results

The modernisation of any industry is enriched by developing the knowledge and skills of its labour-force through effective training received in the classroom. The qualitative data obtained from the textile graduates and heads of the visual arts department indicated that the pedagogical content knowledge proficiencies of the textile teachers cannot equip the school graduates with the requisite skills needed to modernise the indigenous Ghanaian textile industry. The findings
revealed that Ghana senior high school textile graduates lacked the necessary skills needed to modernise the indigenous textile industry due to the textile teachers’ insufficient pedagogical content knowledge. A respondent textile graduate A indicated that:

*Our textile teachers who attended polytechnic have some practical skills to help bring some modernisation to our industry but when they teach we don't understand because they lack pedagogical strategies since most of them are not trained as teachers. Those our teachers who went to university have the teaching skills but lack enough practical skills to teach and so they only taught us theory instead of practical.*

The respondent textile graduate B revealed that:

*We did not do enough practicals during our training and so the majority of us lack the skills of most of the production activities here in the indigenous textile industry. We did not have any industrial attachment throughout our study because it was not part of our senior high school curriculum. I came here before I learned most of the skills use in production.*

Respondent textile graduate C indicated that:

*The practical skills textile teachers possess can never in any way help us compete with those who passed through apprenticeship and are working in the industry let alone help us to bring a world-class modernisation to the indigenous textile industry.*

Respondent textile graduate D said that:

*To be frank, my textile teachers are not competent enough to help us bring modernisation to the indigenous textile industry. They are not well equipped with adequate practical skills, to help us bring modernisation to the indigenous textile industry. Because they lack some practical skills, they concentrate on theory than practical. Ghana Education Service does not organise workshops and industrial attachments for the textile teachers to update their skills and*
so most of them are still equipping students with their inadequate and outdated skills.

The present findings concur to Audu et al., (2013) who opine that graduates from skill training institutions lack skills needed to transform indigenous industries because the pedagogical methods used in technical and vocational training institutions have not succeeded in imparting constructively on practical skills achievement of the graduates. The findings are also in support of Idris and Rajuddin (2012) who opine that industrial employers have constantly expressed their worry about the quality of the current technical and vocational graduates not having appropriate skills required for employment in the industries.

The findings are in agreement with Netherland Organisation for International Cooperation in Higher Education (2010) that explains that there are numerous challenges confronting graduates of skill training institutions in terms of practical skills acquisition in many developing countries since the skills they acquired from school is not relevant to the needs of industries. The current findings are also in agreement with Ideh (2013) who states that most of the technical and vocational graduates are considered to be ill-equipped and declared unemployable due to the quality of training received in the classroom.

4.5 Nature of Pedagogical Strategies Used By Ghana Senior High School Textile Teachers in Training their Students

The third objective of this study investigated the nature of pedagogical strategies used by Ghana senior high school textile teachers in training their students. To
achieve this objective, the researcher first carried out descriptive and inferential statistics analyses followed by qualitative data analysis.

4.5.1 Descriptive Data Analysis

Textile teachers were asked to rate how often they use various pedagogical strategies during teaching. The scores of the teachers were analysed to obtain percentages. The results are displayed in Table 4.10

Table 4.10: Nature of pedagogical strategies used by textile teachers in training their students

<table>
<thead>
<tr>
<th>Pedagogical Strategy</th>
<th>Never (0.0%)</th>
<th>Rarely (0.0%)</th>
<th>Often (28.2%)</th>
<th>Always (71.8%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>0</td>
<td>0</td>
<td>58</td>
<td>148</td>
</tr>
<tr>
<td>Discussion</td>
<td>0</td>
<td>33 (16%)</td>
<td>173 (84%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Demonstration</td>
<td>45 (21.8%)</td>
<td>136 (66%)</td>
<td>25 (12.2%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Project</td>
<td>197 (95.6%)</td>
<td>9 (4.4%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Field Trip</td>
<td>186 (90.3%)</td>
<td>20 (7.7%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Work-Based</td>
<td>206 (100%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
</tr>
</tbody>
</table>

Results in Table 4.10 indicate that the majority of the textile teachers (71.8%) used the lecture method of teaching always while (28.2%) often used it. The results in Table 4.10 also show that apart from lecture method (84%) of the textile teachers often used discussion method to teach their learners whilst (16%) rarely used the discussion method to teach. Concerning the demonstration method of teaching, the majority of the textile teachers (66%) rarely used the demonstration method in teaching, (21.8%) never used it while (2%) often used the demonstration method to transmit skills to their learners. It was also revealed in Table 4.10 that (95.6%) textile teachers never used the project method whilst (4.4%) rarely used the project method in teaching.
It is indicated in Table 4.10 that, (90.3%) textile teachers never used the field trip method while (7.3%) rarely used the method in teaching. Regarding the work-based method of teaching, all the textile teachers (100%) said they never used this method before because Ghana senior high schools textile curriculum did not make provision for work-based training. From the results obtained, it can be seen that, majority of textile teachers never or rarely used appropriate vocational skills pedagogical strategies in teaching the skills school graduates’ needed to modernise the indigenous textile industry in Ghana.

4.5.2 Hypothesis Testing

To determine the relationship between the nature of pedagogical strategies used by Ghana senior high school textile teachers and school graduates’ participation in the modernisation of indigenous textile industry, five (5) sub-null hypotheses were derived from null hypothesis three (H03) which reads as: there is no statistically significant relationship between the nature of pedagogical strategies used by Ghana senior high school textile teachers and school graduates’ participation in the modernisation of the indigenous textile industry. The five (5) sub-null hypotheses were as follows:

i. \( H_{03.1} \): There is no statistically significant relationship between textile teachers’ use of the lecture method of teaching and school graduates participation in the modernisation of the indigenous textile industry.

ii. \( H_{03.2} \): There is no statistically significant relationship between textile teachers’ use of discussion method of teaching and school graduates participation in the modernisation of the indigenous textile industry.
iii. $H_{0.3.3}$: There is no statistically significant relationship between textile teachers’ use of demonstration method of teaching and school graduates participation in the modernisation of the indigenous textile industry.

iv. $H_{0.3.4}$: There is no statistically significant relationship between textile teachers’ use of project method of teaching and school graduates participation in the modernisation of the indigenous textile industry.

v. $H_{0.3.5}$: There is no statistically significant relationship between textile teachers’ use of field trip method of teaching and school graduates participation in the modernisation of the indigenous textile industry.

Pearson’s point-biserial correlation coefficient was used to determine the relationship between textile teachers’ use of the lecture method of teaching and school graduates participation in the modernisation of the indigenous textile industry. The results are summarised in Table 4.11.

**Table 4.11: Point-biserial results on use of lecture method and the modernisation of indigenous textile industry**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation ($r$)</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H_{0.3.1}$: There is no statistically significant relationship between textile teachers’ use of lecture method of teaching and school graduates participation in modernisation of indigenous textile industry.</td>
<td>.504**</td>
<td>.001</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed). N= 206**

The sub-null three ($H_{0.3.1}$) was to find out the relationship between textile teachers’ use of lecture method of teaching and school graduates’ participation in the modernisation of the indigenous textile industry. The results in Table 4.11
reveal that there was a statistically significant relationship between textile teachers use of lecture method and school graduates participation in the modernisation of the indigenous textile industry \((r = .504, n = 206, \ p = .01)\). The sub-null hypothesis \(H_{0.3.1}\) was, therefore, rejected. The study concluded that there was a statistically significant relationship between textile teachers’ use of lecture method and school graduates’ participation in the modernisation of the indigenous textile industry.

Pearson’s point-biserial correlation coefficient was used to determine if there is a significant relationship between textile teachers’ use of discussion method of teaching and school graduates participation in the modernisation of the indigenous textile industry. The results are summarised in Table 4.12

**Table 4.12: Point-biserial results on use of discussion method and the modernisation of indigenous textile industry**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation ((r))</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(H_{0.3.2}: ) There is no statistically significant relationship between textile teachers’ use of discussion method of teaching and school graduates participation in modernisation of indigenous textile industry.</td>
<td>.611**</td>
<td>.001</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed). N= 206**

The analyses in Table 4.12 reveal a statistically significant relationship between textile teachers’ use of discussion method of teaching and school graduates participation in the modernisation of the indigenous textile industry \((r = .611, n = 206, \ p = .01)\). The sub-null hypothesis \((H_{0.3.2})\) was rejected and the study
concluded that there was a statistically significant relationship between textile teachers use of discussion method of teaching and school graduates participation in the modernisation of the indigenous textile industry.

To test the sub-null hypothesis ($H_{0.3.3}$) which states there is no statistically significant relationship between textile teachers’ use of demonstration method of teaching and school graduates participation in the modernisation of the indigenous textile industry, Pearson’s point-biserial correlation coefficient was employed. The results are presented in Table 4.13.

**Table 4.13: Point-biserial results on use of demonstration method and the modernisation of indigenous textile industry**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation ($r$)</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H_{0.3.3}$: There is no statistically significant relationship between textile teachers’ use of demonstration method of teaching and school graduates participation in modernisation of indigenous textile industry.</td>
<td>0.733**</td>
<td>.001</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed). N= 206**

The sub-null hypothesis ($H_{0.3.3}$) intended to find out whether there was a significant relationship between textile teachers’ use of demonstration method of teaching and school graduates participation in the modernisation of the indigenous textile industry. The sub-null hypothesis ($H_{0.3.3}$) was tested at the 0.05 significance level using Point-biserial correlation. The findings in Table 4.13 suggest that there was a statistically significant relationship between textile teachers’ use of demonstration method of teaching and school graduates
participation in the modernisation of the indigenous textile industry \((r = .733, n = 206, p = .01)\).

The sub-null hypothesis that states \((H_{0.3.3})\) there is no statistically significant relationship between textile teachers’ use of demonstration method of teaching and school graduates participation in the modernisation of the indigenous textile industry was rejected. The conclusion is, therefore, drawn that there was a significant relationship between textile teachers’ use of demonstration method of teaching and school graduates participation in the modernisation of the indigenous textile industry.

The sub-null hypothesis \((H_{0.3.4})\) was to find out if there was a significant relationship between textile teachers’ use of project method of teaching and school graduates participation in the modernisation of the indigenous textile industry. Pearson’s point-biserial correlation coefficient was used to test this sub-null hypothesis and the results are presented in Table 4.14.

**Table 4.14: Point-biserial results on use of project method and the modernisation of indigenous textile industry**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation ((r))</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>H_{0.3.4}</em>: There is no statistically significant relationship between textile teachers’ use of project method of teaching and school graduates participation in modernisation of indigenous textile industry.</td>
<td>.535**</td>
<td>.001</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed).\(N = 206\)**
The results in Table 4.14 clearly show that there was a relationship between the use of the project method of teaching and school graduates participation in the modernisation of the indigenous textile industry ($r = .535, n = 206, p = .01$). The sub-null hypothesis ($H_{0.3.4}$) that states there is no statistically significant relationship between textile teachers’ use of project method and school graduates participation in the modernisation of the indigenous textile industry was rejected. The study therefore, concluded that there was a significant relationship between textile teachers’ use of the project method of teaching and school graduates participation in the modernisation of the indigenous textile industry.

To test the sub-null hypothesis ($H_{0.3.5}$) a bivariate correlational analysis using Pearson product moment correlation coefficient was performed and the findings are presented in Table 4.15.

**Table 4.15: Point-biserial results on use of field trip method and the modernisation of indigenous textile industry**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation ($r$)</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H_{0.3.5}$: There is no statistically significant relationship between textile teachers’ use of fieldtrip method of teaching and school graduates participation in modernisation of indigenous textile industry.</td>
<td>.685**</td>
<td>.001</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed). N= 206**

The findings in Table 4.15 indicate that there was a statistically significant relationship between textile teachers’ use of field trip method of teaching and school graduates participation in the modernisation of the indigenous textile
industry \((r = .685, n = 206, p = .01)\). The sub-null null hypothesis \((H_{03.5})\) that states there is no statistically significant relationship between textile teachers’ use of field trip method of teaching and school graduates participation in the modernisation of the indigenous textile industry was rejected. The study, therefore, concluded that there was a strong positive relationship between textile teachers’ use of field trip method of teaching and school graduates participation in the modernisation of the indigenous textile industry.

### 4.5.3 Discussion of the Results

The nature of pedagogical strategies is how teaching and learning processes are conducted in and outside the classroom. The results obtained from the questionnaire, interview guide and observation showed that the majority of the textile teachers used the lecture and discussion methods frequently during the delivery of most of the textile topics than any other instructional strategies while a few teachers used the method rarely.

These findings are in support of Kimotho (2016) who states that the use of traditional lecture teaching approach usually produces poor results because of poor retention ability since the average amount of information retained through the use of lecture method of teaching is only 5%. The present findings are also in corroboration with Yusofa, Roddin and Awang (2014) who are of the view that lecture method of teaching has found to limit learners active involvement in classroom learning process which indirectly becomes a limitation for learners to
facilitate the integration of knowledge and skills prior to transferring it into a real employment situation.

A higher number of textile teachers indicated that they often used the discussion method of teaching while a fewer number of them said they rarely used it. Data obtained from observation in the classroom validated the findings obtained from the questionnaire. The use of discussion method of teaching for a vocational subject like textiles concurs to Rahman et al., (2011) who state that using discussion method of teaching can be an efficient means of aiding learners to apply abstract ideas and critical thinking about what is learned in the classroom.

The majority of the textile teachers indicated they rarely used the demonstration method in teaching whilst a fewer number of them said they often or never used this method. These findings are not in conformity with Veselinovska (2013) who states that learners remember 10% of what they read, 20% of what they heard, 30% of what they saw and 90% of what they observed and did. The findings are also not agreed with the findings of Williams and McClure (2010) who opine that knowledge and skill retention is high and always consistent over time for the learners who received their learning process through demonstration than lecture and discussion method of teaching. The present findings are also in agreement with Auwal (2013) who is of the view that the demonstration method of teaching and learning brings about better retention of learned materials than the discussion method of teaching.
The results obtained on the project method of teaching showed that the majority of the textile teachers never used the project method of teaching during teaching while fewer of them rarely used this method of teaching. The findings of the study also indicated that the majority of the textile teachers never used field trip method of teaching while a very small number used it. About the work-based method of teaching, all the teachers said they never used it since it is not part of the Ghana senior high schools textile curriculum. These current findings are not in agreement with Audu (2014) who states that the most appropriate and effective pedagogical strategies to use to aid learners to acquire skills needed to transform industries are work-based learning.

The observation data obtained on the nature of pedagogical strategies used by Ghana senior high schools textile teachers also indicated that they always used lecture method of teaching as the most favourite method to teach practical topics such as weaving, printing, embroidery and dyeing instead of demonstration, project method, field trip and work-based learning. In all the findings above, it can be seen that textile teachers always used lecture and discussion pedagogical strategies when teaching their students. The rest of the teaching strategies such as demonstration was rarely used whilst field trips, project method and work-based were never used by the majority of the teachers due to lack of time needed to complete the syllabus, resource materials, training facilities and area of specialisation.
The effect of these findings was that since the relevant vocational skills pedagogical strategies were rarely or never used in training textile graduates, the skills textile graduates needed to modernise the indigenous textile industry had been compromised. The findings correspond to Mbugua et al., (2012) who opine that most of the pedagogical strategies used in teaching TVET students are lecture and discussion methods which are theory-based.

4.6 Influence of challenges facing Ghana senior high school textile training on the operations of indigenous textile industry

This part of the study which addressed the fourth (4th) objective discussed the influence of challenges facing Ghana senior high school textile training on the operations of the indigenous Ghanaian textile industry. First, the descriptive and inferential analyses were done followed by qualitative data analysis.

4.6.1 Descriptive Data Analysis

The section sought the views of textile teachers on the challenges facing Ghana senior high school textile training. The level of agreement or disagreement of textile teachers are shown in Table 4.16.
Table 4.16: Challenges facing Ghana senior high schools textile training

<table>
<thead>
<tr>
<th>Statement</th>
<th>Agreed</th>
<th>Not Sure</th>
<th>Disagreed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My school has a well equipped ICT lab for textile CAD/CAM training</td>
<td>70 (42.9%)</td>
<td>-</td>
<td>136 (57.1%)</td>
</tr>
<tr>
<td>needed to modernise the indigenous textile industry.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. My school authorities supply materials for practicals.</td>
<td>55 (26.7%)</td>
<td>-</td>
<td>151 (73.3%)</td>
</tr>
<tr>
<td>3. My school has enough textile tools and equipment used in indigenous</td>
<td>94 (45.7%)</td>
<td>-</td>
<td>112 (54.3%)</td>
</tr>
<tr>
<td>industry.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. There are enough published textile textbooks in the system.</td>
<td>76 (36.8%)</td>
<td>-</td>
<td>130 (63.2%)</td>
</tr>
<tr>
<td>5. My school has a permanent and well equipped textile studio for practical</td>
<td>53 (25.7%)</td>
<td>-</td>
<td>153 (74.3%)</td>
</tr>
<tr>
<td>works.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The time and number of periods allotted to textile programme is</td>
<td>42 (20.4%)</td>
<td>-</td>
<td>164 (79.6%)</td>
</tr>
<tr>
<td>sufficient for practical works.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I attend organised workshop and industrial attachment periodically to</td>
<td>91 (44.2%)</td>
<td>115 (55.8%)</td>
<td></td>
</tr>
<tr>
<td>update my skills.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results in Table 4.16 showed that (57.1%) of the senior high schools have no well-equipped ICT lab for textile CAD/CAM training needed to modernise the indigenous textile industry whilst (42.9%) have well-resourced ICT lab for CAD/CAM training. The majority of the textile teachers (73.3%) indicated that school authorities never supplied textile learning materials for effective practical
works while fewer number (26.7%) stated authorities supplied materials. The majority of textile teachers (54.3%) also indicated that their schools did not have enough textile tools and equipment used in indigenous industry while (45.7%) said their school had enough textile tools and equipment.

Concerning the availability of enough published textile textbooks in the system, a higher number of teachers (63.2%) disagreed with the statement while (36.8%) agreed with the statement. It was also revealed by the textile teachers that majority of the schools (74.3%) had no permanent and well-equipped textile studio for practical works while (25.7%) said they had a permanent and well-equipped studio for practical works. A larger number of textile teachers (79.6%) felt that the time and number of periods allotted to the textile programme was not sufficient for effective practical works but (20.4%) affirmed to the statement.

Most the textile teachers (55.8%) opined that they did not attend workshops and industrial attachments periodically to update their skills while (44.2%) said they attend organised workshops periodically but never attended any industrial attachment before. The results in Table 4.16 indicate that teachers had a high negative response to all the statements. This clearly showed that apart from the pedagogical content knowledge, nature of pedagogical strategies used by textile teachers, availability, accessibility and usability of training facilities and resources, there were also other major challenges facing the skills Ghana senior high school graduates needed to modernise the indigenous Ghanaian textile industry.
4.6.2 Hypothesis Testing

To determine if the challenges facing Ghana senior high schools textile training had a statistically significant influence on the operations of the indigenous textile industry or not, five (5) sub-null hypotheses were derived from the null hypothesis $H_0.4$. The five (5) sub-null hypotheses were as follows:

i. $H_{0.4.1}$: lack of well-equipped ICT labs in senior high school has no significant influence on the operations of the indigenous textile industry.

ii. $H_{0.4.2}$: lack of textile training materials in senior high schools has no significant influence on the operations of the indigenous textile industry.

iii. $H_{0.4.3}$: lack of textile training tools and equipment in senior high schools has no significant influence on the operations of the indigenous textile industry.

iv. $H_{0.4.4}$: The time allotted to Ghana senior high schools textile training has no significant influence on the operations of the indigenous textile industry.

v. $H_{0.4.5}$: lack of organised workshops and industrial attachment for textile teachers have no significant influence on the operations of the indigenous textile industry.

The sub-null hypothesis ($H_{0.4.1}$) was tested using a Point-biserial correlation coefficient and the findings are presented in Table 4.17.
The findings in Table 4.17 show that lack of well-equipped ICT labs in Ghana senior high schools had a significant influence on the operations of the indigenous textile industry ($r = .730$, $n = 206$, $p = .01$). The sub-null hypothesis ($H_04.1$) was, therefore, rejected and the conclusion was that the lack of well-equipped ICT labs in Ghana senior high schools had a significant influence on the operations of the indigenous textile industry.

The sub-null hypothesis two ($H_04.2$) analysis was carried out using the Pearson point-biserial correlation coefficient. The findings are indicated in Table 4.18.

The results in Table 4.18 indicate that lack of textile training materials in senior high schools had a significant influence on the operations of the indigenous textile industry. **Correlation is significant at the 0.01 level (2-tailed). $N= 206$**
textile industry \( (r = .785, n = 206, \ p = .01) \). The sub-null hypothesis \( (H_{04.2}) \) that states lack of textile training materials in senior high schools has no significant influence on the operations of the indigenous textile industry was rejected. The study, therefore, concluded that lack of textile training materials in senior high schools had a significant influence on the operations of the indigenous textile industry.

To test the sub-null hypothesis \( (H_{04.3}) \), Pearson point-biserial correlation coefficient analysis was executed and the findings are summarised in Table 4.19.

**Table 4.19: Point-biserial results on influence of lack of textile training tools & equipment on the operations of indigenous textile industry**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation (r)</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( H_{04.3} ): lack of textile training tools &amp; equipment in senior high schools has no significant influence on the operations of indigenous textile industry.</td>
<td>.896**</td>
<td>.001</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed). \( N = 206 \)**

The results in Table 4.19 reveal that lack of textile training tools and equipment in senior high schools had a significant influence on the operations of the indigenous textile industry \( (r = .896, n = 206, \ p = .01) \). The sub-null hypothesis \( (H_{04.3}) \) that states lack of textile training tools and equipment in senior high schools has no significant influence on the operations of the indigenous textile industry was rejected. The conclusion was that lack of textile training tools and equipment in senior high schools had a significant influence on the operations of the indigenous textile industry.
To analyse sub-null hypothesis ($H_{0.4.4}$), the Point-biserial correlation coefficient was employed to assess the influence of time allotted to Ghana senior high schools textile training on the operations of the indigenous textile industry. The findings are summarised in Table 4.20.

**Table 4.20: Point-biserial results on influence of time allotted to SHS textile training on the operations of the indigenous textile industry**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation ($r$)</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H_{0.4.4}$: The time allotted to Ghana senior high textile training has no significant influence on the operations of indigenous textile industry.</td>
<td>.607**</td>
<td>.001</td>
</tr>
</tbody>
</table>

*Correlation is significant at the 0.01 level (2-tailed). N= 206*

The results in Table 4.20 show that the time allotted to Ghana senior high textile training had a significant influence on the operations of the indigenous textile industry ($r = .607$, $n = 206$, $p = .01$). The sub-null hypothesis ($H_{0.4.4}$) that states the time allotted to Ghana senior high textile training has no significant influence on the operations of the indigenous textile industry was rejected. The study, therefore, concluded that the time allotted to Ghana senior high textile training had a significant influence on the operations of the indigenous textile industry.

Sub-null hypothesis ($H_{0.4.5}$) was tested using a Point-biserial correlation coefficient to assess the relationships between the independent variable and the dependent variable. The findings are presented in Table 4.21.
Table 4.21: Point-biserial results on influence of lack of regularly workshop & industrial attachment on the operations of the indigenous textile industry

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation (r)</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H_04.5$: Lack of regularly organised workshops and industrial attachment for textile teachers has no significant influence on the operations of indigenous textile industry.</td>
<td>.850**</td>
<td>.001</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed). N= 206

The findings in Table 4.21 reveal that lack of regularly organised workshops and industry attachment for textile teachers had a significant influence on the operations of the indigenous textile industry ($r = .850$, $n = 206$, $p = .01$). The sub-null hypothesis ($H_04.5$) that states lack of regularly organised workshops and industry attachment for textile teachers have no significant influence on the operations of the indigenous textile industry was rejected and the conclusion was that lack of regularly organised workshops and industrial attachment for textile teachers had a significant influence on the operations of the indigenous textile industry.

4.6.3 Discussion of the Qualitative Data obtained from Textile Teachers and HoDs

The qualitative data obtained from the open-ended questionnaire and interview guide indicated that Ghana senior high school textile training has a lot of challenges. The first challenge was the low enrolment of students. A respondent HOD A indicated that:
Majority of senior high schools which used to offer textile are no more offering the course. The few senior high schools offering textiles also find it difficult to get students due to the 2010 educational reform and policy on visual arts subject combination. Educational policymakers had made a policy that every visual arts student must offer one 2-dimension visual arts subject and one 3-dimension visual arts subject in addition to General Knowledge in Art which is a compulsory subject to all visual arts students. Because of this policy, most senior high schools that used to pursue textile and other 2-dimension visual arts subjects had replaced textiles with a 3-dimension subject when the policy of one 2D and one 3D was implemented in 2011. The motive of the replacement was:

i. non-availability of qualified textiles teachers in the system.

ii. the subject is too expensive in terms of tools, equipment and materials for practical works.

iii. the subject is too difficult to study compared to other visual arts subjects.

iv. textile practical lessons consume much time than other visual arts subjects.

v. there is no job since most of the textile industries are collapsing.

A respondent HOD B indicated that:

We lack a permanent studio. We do not also have tools, equipment and materials for practical works for both the teachers and students. As a result, most of the practical lessons are taught theoretically for the students to pass the final examination than to equip them with skills that will enable them to create jobs for themselves and others and also help bring modernisation to the indigenous textile industry. Another most important challenge facing senior high schools textile training is the lack of currently published textbooks to equip students with current knowledge and skills needed in the indigenous textile industry. Also, the teachers’ and students’ inability to use ICT to search for current information, skills and mode of textile production due to lack of well-equipped ICT lab is another challenge facing the SHS textile training in Ghana.

The data obtained through the open-ended questionnaire also revealed that most of the senior high schools lack training facilities and resources to equip students with the skills needed to transform the indigenous textile industry. The
quantitative data obtained through closed-ended questionnaire showed that the time allotted to the textile practical lessons was not sufficient to achieve the objectives of the practical lesson. Data obtained through the questionnaire further revealed that textile teachers never attended organised workshops and industrial attachments periodical to update their skills.

A respondent HOD C indicated that:

*Most of these textile teachers had completed their training over ten years ago and so lack modern skills school graduates required to bring innovations to the indigenous textile industry.*

The findings in this study are in support of Netherland Organisation for International Cooperation in Higher Education (NICHE, 2010) which came out with a paper that there are several challenges facing graduates from technical and vocational institutions in most developing countries in terms of practical skills acquisition due to lack of training tools or equipment, poor resource materials and also training acquired are theoretical instead of practical. NICHE (2010), continues that inadequate training tools or equipment, facilities and training materials lead to learners’ congestion during practical lessons, with a greater number of the learners only observing the demonstration instead of hands-on practice.

The present findings are also in agreement with Munishi (2016) who postulates that insufficient provision of teaching and learning resources in skill training institutions is yet another obstruction affecting job skills acquisition of technical
and vocational education graduates. Again, the present findings are in support of Anindo (2016) who states that transmitting skills to students requires tools, equipment, well-equipped studio and effective utilisation of these facilities hence the absence of all these in most technical and vocational institutions would badly affect the quality and relevance of the skills acquired by the graduates.

4.6.4 Discussion of the Qualitative Data obtained from Textile Graduates Working in the Indigenous Textile Industry

This sub-section sought views of senior high school textile graduates working in the indigenous textile industry on the influence of challenges facing Ghana senior high schools textile training on the operations of the indigenous textile industry. The textile graduates working in the industry were selected because they have experience in what transpired in the classroom and the indigenous textile industry. The interview conducted with the textile graduates revealed that the challenges facing Ghana senior high schools textile training had influence on the operations of the indigenous Ghanaian textile industry.

Respondent textile graduate A indicated that:

*The indigenous Ghanaian textile industry artists lacked modern tools and equipment and technical know-how in quality and quantity textile production methodologies to aid ease labour-intensive production processes.*

The respondent textile graduate B continued that:

*There is no textile training institution to organise workshops for us to update our skills in terms of modern methods of textile production and so even though we produce beautiful textile goods, we are always unable to
meet a deadline for large orders on time when the need arises. For instance, I normally use the whole day to weave only two (2) yards of kente depending on the intricate and quality of the design. My brother the smock producer over there can only produce one smock garment a day for hand sewing and three for machine sewing respectively. Though the smocks sewn by hand have a higher value than those sewn by machine, there is the need to use modern technology so that we can produce in large quantities within a short time.

The respondent textile graduate C continued that:

The inability of textile training institutions to turn out graduates that can help bring technologies needed to compete with foreign textile industries is another challenge to the industry. The textile training institutions are producing graduates that cannot help to bring innovation to the industry and so we lack modern tools, equipment and technological mode of textile production in our operations.

4.7 A Model for Indigenous Ghanaian Textile Industry Modernisation

A model is a representation of a process and in this case the significant relationship established between the independent and the dependent variables made the researcher to suggest a model for indigenous Ghanaian textile industry modernisation. This model is my key contribution to knowledge after this study. This model is a process model that follows four steps of model development.

First Step

The first step firms a link of the major process and is often referred to as the ‘mainstream’ step. Figure 4.6 indicates the first step of the pedagogical model for indigenous Ghanaian textile industry modernisation. This emphasises that textile teachers’ preparation and resources are the key to the modernisation of
the indigenous Ghanaian textile industry. This came out strongly from the data collected.

Second Step

The second stage of the pedagogical model for indigenous Ghanaian textile industry modernisation has the introduction of affective variables to the mainstream step of the model. The affective variables include the pedagogical content knowledge proficiencies of textile teachers, the nature of pedagogical strategies used by textile teachers and availability, accessibility and usability of textile training facilities and resources.

From the results, senior high schools textile teachers’ proficiencies in content and pedagogical strategies will require modern facilities and resources (well-equipped ICT labs, tools, equipment and materials) to enable them impart skills to the learners (students). If this is done, then the learners will be qualified with skills to produce quality products for modernisation. For the textile teachers to be effective, they must be sponsored to regular industrial attachment in both local and international textile industries to acquire relevant modern knowledge and skills.
The teachers’ level of education must therefore, be at least bachelor degree with education background. Technical universities offering textiles must introduce education into their curriculum to enable them to equip learners with pedagogical strategies since most their products find themselves in senior high schools as teachers. Industrial attachment must be introduced into Ghana senior high school textile training system. The training resources must be current and relevant if the element of the indigenous textile industry is to be useful. Figure 4. 7 indicates the second stage of the pedagogical model for indigenous Ghanaian textile industry modernisation.

![Figure 4. 7:Second stage in model construction](image)

**Third Step**

Proper resources when put in good use should give practical skills to learners in the workshops. In addition, the machines in places of attachment can boost or sharpen skills. This is an important stage and a combination of skills learners acquired at schools and in attachment can solidify the necessary skills. Such skills should be able to be reflected in quality products. The key instructional
approach should therefore be heuristic in nature. Figure 4.8 indicates the third stage of the pedagogical model for indigenous Ghanaian textile industry modernisation.

![Figure 4.8: Third stage in model construction](image)

**Final Model**

The process should end with a production of quality indigenous textile products which can compete internationally and hence keep out other external textile producers. The Ghana government and its people can trade intentionally to bring some foreign exchange and in turn boost more production internationally, which means more jobs and a better life for the locals. It is the goal of every industry to excel in terms of profit making and job provision to the locals. The researcher is aware these are the main objectives of the indigenous Ghanaian textile industry.

Modernisation can be expensive especially if the rapid approach is taken. But for a developing country like Ghana, a ‘step-by-step’ process is affordable.
Figure 4.9 indicates the final stage of the pedagogical model for indigenous Ghanaian textile industry modernisation.

![Diagram of the pedagogical model](image)

**Figure 4.9: Final model for indigenous textile industry modernisation**

4.8 **Summary of the Chapter**

This chapter analysed demographic variables of the respondents and quantitative data obtained from closed-ended portion of the questionnaires and structured portion of textile graduates and HoDs interview guide. The chapter also analysed qualitative data obtained from the open-ended part of the textile teachers’ questionnaire, an interview guide of textile graduates and HoDs and observation guide. In the quantitative analysis, 206 valid questionnaires were analysed using descriptive and inferential statistics.

The qualitative data obtained from the textile graduates and HoDs were analysed manually under the various themes using a narrative approach. The summary of
findings, conclusions and recommendations based on these findings are presented in the next chapter.
CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction
This chapter presents the summary of the study and the key findings on the influence of textile teachers’ pedagogical content knowledge on senior high school graduates’ participation in the modernisation of the indigenous Ghanaian textile industry. The chapter also covers conclusions drawn from the study and suggested recommendations as well as suggestions for further studies.

5.2 Summary of the Study
The purpose of this study was to investigate the influence of pedagogical content knowledge of Ghana senior high school textile teachers on school graduate participation in the modernisation of the indigenous textile industry. The study was guided by the following five (5) objectives: to establish the influence of demographic characteristics of Ghana senior high schools textile teachers on school graduates’ participation in the modernisation of the indigenous textile industry; to establish the influence of pedagogical content knowledge of Ghana senior high schools textile teachers on the skills acquisition of school graduates; to determine the nature of pedagogical strategies used by Ghana senior high schools textile teachers in training their students; to determine the influence of challenges facing Ghana senior high schools textile training on the operations of the indigenous textile industry and to develop a model for the modernisation of the indigenous Ghanaian textile industry based on the findings of the study.
The study employed a system theory suggested by Mele, Pels and Polese (2010) and Bertalanffy (1968). The study was centred on three variables namely; independent, intervening and dependent variables. The main findings based on the objectives of this study are summarised in the section below.

5.3 Summary of the Main Findings

This section summarises the major findings in line with the objectives of this study. The summary of the main findings entailed observation and analysis of the efforts by Ghana senior high schools textile teachers to engage graduates in the modernisation of the indigenous textile industry through the use of innovative classroom lessons and the assessment of school graduates in the transformation of the indigenous textile industry.

The first objective of the study investigated the influence of demographic characteristics of Ghana senior high school textile teachers on school graduates’ participation in the modernisation of the indigenous textile industry. The findings revealed that the demographic characteristics of Ghana senior high schools textile teachers had a statistically significant influence on school graduates’ participation in the modernisation of the indigenous textile industry because all the \( p \)-values of the demographic variables of the textile teachers tested were less than 0.05.

The second objective of the study was to establish the influence of pedagogical content knowledge of Ghana senior high textile teachers on the skills acquisition
of school graduates. The Pearson point-biserial analyses done indicated that there was a significant relationship between pedagogical content knowledge of Ghana senior high textile teachers and the skills acquisition of school graduates because all the p-values of the items tested were less than 0.05. The qualitative data obtained from the graduate and visual arts HoDs also indicated that the pedagogical content knowledge competencies of the textile teachers cannot equip the school graduates’ with the skills needed to modernise the indigenous Ghanaian textile industry.

The third objective sought to determine the nature of pedagogical strategies used by Ghana senior high schools textile teachers in training their students. The findings indicated that the nature of pedagogical strategies used by Ghana senior high school textile teachers has a statistically significant relationship on school graduates’ participation in the modernisation of the indigenous textile industry. The qualitative data collected through observation schedule also revealed that the majority of the textile teachers always or often used lecture and discussion pedagogical strategies to teach than the skills acquisition pedagogical strategies such as the demonstration, project, field trip and work-based.

Objective four of the study was to establish the influence of challenges facing Ghana senior high schools textile training on the operations of the indigenous textile industry. The findings indicated that the challenges facing Ghana senior high school textile training had a significant influence on the operations of the
indigenous textile industry. The qualitative data obtained found the following as the challenges facing Ghana senior high schools textile training:

i. low students’ enrolment due 2010 educational reform policy on visual arts subject combination.

ii. lack of permanent textile studio for practical works.

iii. lack of modern training equipment and materials.

iv. lack of currently published textile textbooks in the system.

v. lack of ample time for effective practical works.

vi. lack of regularly organised workshops and the industrial attachment for textile teachers to update their skills on the pedagogical strategies and modern mode of production.

5.4 Conclusions

The study made the following important conclusions based on the above findings:

i. the demographic characteristics of Ghana senior high school textile teachers such as gender, age, qualification and work experience had a significant influence on senior high school graduates’ participation in the modernisation of the indigenous Ghanaian textile industry.

ii. the pedagogical content knowledge of the Ghana senior high school textile teachers had a significant influence on senior high school graduates participation in the modernisation of the indigenous Ghanaian textile industry.
iii. the nature of pedagogical strategies used by Ghana senior high school textile teachers had a statistically significant influence on school graduates’ participation in the modernisation of the indigenous textile industry.

iv. the challenges facing Ghana senior high school textile training had a significant influence on the operations of the indigenous textile industry.

5.5 Recommendations

The following recommendations were made based on the results and conclusions of the study:

i. the data obtained on the gender indicated that more male study textile than the female. This was attributed to lack of female interest in studying textiles. This study, therefore, recommended that there should be a scholarship package for the ladies who intend to study textiles so as alleviate inequity in the study of textiles between men and women.

ii. ministry of education should periodically sponsor textile teachers to have industrial attachments in both local and international renowned textile industries to learn modern skills of textile manufacturing.

iii. There should also be periodic capacity building workshops on vocational pedagogical strategies to enable the textile teachers to effectively transmit modern skills to the students.

iv. work-based (industrial attachment) should be introduced into Ghana senior high schools textile training system.
v. the policy on visual arts subject combination should be abolished to enable students interested in studying textiles to do so.

vi. ministry of education should try out the suggested model in an attempt to determine its operation in the modernisation of the indigenous Ghanaian textile industry.

5.5.1 Recommendations for Further Research

This study suggested the following areas for further study:

i. the influence of pedagogical content knowledge of Ghana technical and vocational school textile teachers on the modernisation of the indigenous textile industry.

ii. an analogous study should also be conducted in other regions of Ghana because this study was conducted in only three regions namely; Volta, Ashanti and Northern regions.

iii. this study only focused on senior high school textile training and so another study could be conducted on the influence of pedagogical content knowledge of other senior high school visual arts subjects on the modernisation of their indigenous industries.

iv. Ministry of Education through Curriculum Research and Development Division should implement the model this study design to enable Ghana senior high school textile teachers to equip the school textile graduate with the skills needed to modernise the indigenous textile industry.
REFERENCES


Kok Eng, T. (2013). *Adapting or adopting an instrument for your study.* School of Educational Studies, Universiti Sains.


UNESCO, (2016). *Non-formal and informal programs and activities that promote the acquisition of knowledge and skills in areas of global citizenship education and education for sustainable development*. New York: UNESCO.


APPENDICES

Appendix A
Questionnaire for Senior High School Textile Teachers

Dear Sir/Madam,

I am researching on the topic: **Influence of Textile Teachers’ Pedagogical Content Knowledge on Senior High School Graduates Participation in Modernisation of Indigenous Ghanaian Textile Industry.** You have been chosen to partake by responding to this interview guide. Please feel free to respond to the questions. Any information given shall be treated as confidential.

Johnson Kofi Kassah
PhD Student, Kenyatta University, Kenya

Section A: Demographic Information

1. Gender:
   i. Male (  )
   ii. Female (  )

2. Age
   i. 20 - 25 years (  )
   ii. 26 – 30 years (  )
   iii. 31– 35 years (  )
   iv. 36– 40 years (  )
   v. 41– 45 years (  )
   vi. 46 years above (  )

3. What is your highest qualification?
   i. Masters (  )
   ii. BA/Bed. degree (  )
   iii. Dip/ HND (  )
   iv. Others.................................................................

3. How long have you been teaching in the school?
   i. 1-5 years (  )
   ii. 6-10 years (  )
   iii. 11-15 years (  )
   iv. 16 years and above (  )
Section B: Influence of Textile Teachers’ Pedagogical Content Knowledge on Senior High School Graduates Participation in Modernisation of Indigenous Ghanaian Textile Industry.

Strongly Agree (SA) Agree (A) None (N) Strongly Disagree (SD) Disagree (D)

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SA</td>
</tr>
<tr>
<td>1.</td>
<td>I communicate clearly in the language of instruction orally and in writing.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>I have adequate textile manufacturing practical skills to help my students modernise the indigenous textile industry.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>I use appropriate teaching aids during teaching.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>I use modern vocational pedagogical strategies during teaching to help my students acquire the knowledge and skills they needed to modernise the indigenous textile industry.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>I have an in-depth knowledge and skills on CAD/CAM usage.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Textile teachers with adequate pedagogical content knowledge can help the school graduates modernise the indigenous textile industry.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>The use of appropriate pedagogical strategies can help school graduate modernise the indigenous textile industry.</td>
<td></td>
</tr>
</tbody>
</table>

Section C: Nature of Pedagogical Strategies Use by Textile Teachers in Training their Student

1. How often do you use the following pedagogical strategies? Use a scale where:

Never
Rarely
Often
Always
<table>
<thead>
<tr>
<th>No.</th>
<th>Pedagogical Strategies</th>
<th>Never</th>
<th>Rarely</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Lecture method</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Discussion method</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Demonstration method</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Project method</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Field trip method</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Work-based learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Section D: Challenges Facing Ghana Senior High Schools Textile Training**

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SA</td>
</tr>
<tr>
<td>1.</td>
<td>My school has a well-equipped ICT lab for textile CAD/ CAM training needed to modernise the indigenous textile industry.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>My school authorities supply materials for practicals.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>My school has enough textile tools and equipment used in indigenous industry</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>There are enough published textile textbooks in the system.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>My school has a permanent and well equipped textile studio for practical works.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>The time and number of periods allotted to textile programme is sufficient for practical works.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>I attend organised workshop and industrial attachment periodically to update my skills.</td>
<td></td>
</tr>
</tbody>
</table>

8. Please apart from the challenges above, state any other challenges facing textile training in your school.
   i. ........................................................................................................
   ii. ........................................................................................................
   iii. ........................................................................................................
   iv. ........................................................................................................
   v. ........................................................................................................

THANKS FOR YOUR COOPERATION
Appendix B

Interview Guide for Textile Graduates Working in the Indigenous Textile Industries

Dear Sir/Madam,

I am researching on the topic: Influence of Textile Teachers’ Pedagogical Content Knowledge on Senior High School Graduates Participation in Modernisation of Indigenous Ghanaian Textile Industry. You have been chosen to partake by responding to this interview guide. Please feel free to respond to the questions. Any information given shall be treated as confidential.

Johnson Kofi Kassah
PhD Student, Kenyatta University, Kenya

Section A: Influence of Textile Teachers’ Pedagogical Content Knowledge on Senior High School Graduates Participation in Modernisation of Indigenous Ghanaian Textile Industry.

1. Please do you think the textile training you received equip you with the relevant practical skills needed at your industry?

2. Do you think the textile training you received is helping to bring modernisation to your textile industries?

Section B: Challenges of Indigenous Textile Industry in Ghana

1. Please what are the challenges facing your industry?

2. What are the measures you put in place to respond to these challenges?

THANKS FOR YOUR COOPERATION
Appendix C

Interview Guide for Heads of Visual Arts Department

Dear Sir/Madam,

I am researching on the topic: **Influence of Textile Teachers’ Pedagogical Content Knowledge on Senior High School Graduates Participation in Modernisation of Indigenous Ghanaian Textile Industry.** You have been chosen to partake by responding to this interview guide. Please feel free to respond to the questions. Any information given shall be treated as confidential.

Johnson Kofi Kassah
PhD Student, Kenyatta University, Kenya

Section A: Influence of Textile Teachers’ Pedagogical Content Knowledge on Senior High School Graduates Participation in Modernisation of Indigenous Ghanaian Textile Industry.

1. Do you think the pedagogical content knowledge of the textile teachers are adequate to help students bring modernisation to your textile industries?

Section B: Nature of Pedagogical Strategies Used by Ghana Senior High School Textile Teachers in Training their Students

1. What are the most commonly used pedagogical strategies in delivery of the curriculum by the teachers?
2. How do these strategies influence acquisition of employable skills by the students?

Section D: Challenges of the Operations of the Indigenous Textile Industry in Ghana

1. Please what are the challenges facing textile training in your institution?
2. What are the measures you put in place to respond to these challenges?
Appendix D

Observation Guide for the Nature of Pedagogical Strategies Used in Training Textile Students

This will be used to rate how well the following pedagogical strategies are being used in the classroom/studio by the textile teacher using the following Likert scale.

1) Not at all
2) Very infrequent
3) Frequent
4) Very frequently
5) Always

<table>
<thead>
<tr>
<th>No.</th>
<th>Pedagogical strategy</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Remark on the used strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>i.</td>
<td>Lecture method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii.</td>
<td>Discussion method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii.</td>
<td>Demonstration method</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>iv.</td>
<td>Project method</td>
<td></td>
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</tr>
<tr>
<td>v.</td>
<td>Field trip method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vi.</td>
<td>Work-based</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Other methods
   i. ............................................................................................................
   ii. ............................................................................................................
   iii. ..........................................................................................................  
   iv. .......................................................................................................... 
   v. ............................................................................................................
   vi. .......................................................................................................... 
   vii. .........................................................................................................
Appendix E

Map of Ghana
Appendix F

Map of Africa

GHANA
Appendix G

Letter of Approval of Research Proposal

KENYATTA UNIVERSITY GRADUATE SCHOOL

E-mail: dean-graduate@kun.ac.ke
Website: www.ku.ac.ke

Internal Memo

RCM: Dean, Graduate School

TO: Mr. Johnson K. Kassai
C/o Educational Comm. & Technology Dept.
Kenyatta University

DATE: 24th September, 2018
REF: ESSF/3386/15

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

This is to inform you that Graduate School Board at its meeting of 11th September, 2018 approved your Research Proposal for the Ph.D. Degree, entitled “Influence of Pedagogical Content Knowledge of Ghana Senior High School Textile Teachers on the Modernization of Indigenous Textile Industry”.

You may now proceed with your Data collection, subject to clearance with The Director General, Ghana Education Service.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed supervision Tracking Forms per semester. The form has been developed to replace the progress Report Forms. The Supervision Tracking forms are available at the University’s Website under Graduate School webpage downloads.

By copy of this letter, the Registrar (Academic) is hereby requested to grant you substantive registration for your Ph.D. studies.

Thank you.

SIGNED: HRM

DEAN, GRADUATE SCHOOL

cc: Registrar (Academic), Mr. Likah
C/o Educational Comm. & Technology Dept.

Supervisors:

1. Prof. Nicholas Wanjala
   C/o Educational Comm. & Technology Dept.
   KENYATTA UNIVERSITY

2. Prof. Simon Onsighi
   C/o Educational Comm. & Technology Dept.
   KENYATTA UNIVERSITY

3. Dr. Jacqueline Ikanto
   C/o Fashion Design & Marketing Dept.
   KENYATTA UNIVERSITY

RM/aoa
KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@kunav.c.ke
Website: www.kunav.c.ke

P.O. Box 43644, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 97530
Date: 24th September, 2018

OUR REF: E83F/33386/15

The Director General,
Ghana Education Service,
ACCRA, GHANA

Dear Sir/Madam,

I write to introduce Mr. Kofi who is a Postgraduate Student of this University. He is registered for Ph.D. Degree programme in the Department of Educational Communication & Technology in the School of Education.

Mr. Kofi intends to conduct research for a proposal entitled, “Influence of Pedagogical Content Knowledge of Ghana Senior High School Textile Teachers on the Modernisation of Indigenous Textile Industry”.

Any assistance given will be highly appreciated.

Yours faithfully,

REUBEN MURIUKI
FOR: DEAN, GRADUATE SCHOOL

BM/220
Appendix H

A Letter Requesting for Research Permit from Ghana Education Service,
Accra-Ghana

Educational Communication and Technology Department,
Kenyatta University,
Nairobi, Kenya.
26th September, 2018.

THE DIRECTOR-GENERAL,
GHANA EDUCATION SERVICE,
ACCRA, GHANA.

Dear Sir,

PERMISSION TO COLLECT RESEARCH DATA IN SELECTED SENIOR HIGH SCHOOLS IN GHANA

I am a Ghanaian and PhD student at Kenyatta University, Nairobi, Kenya. I am conducting a research entitled ‘Influence of Pedagogical Content Knowledge of Ghana Senior High School Textile Teachers on the Modernisation of Indigenous Textile Industry’.

I write to officially seek permission to conduct research in some selected senior high schools in Volta region, Ashanti region and Northern region offering textiles.

Attached is the photocopied of my research authorisation letter from Kenyatta University Graduate School.

I hope my permission will be given the needed consideration and attention.

Thank you.

Yours faithfully,

JOHNSON KOFI KASSAH
Appendix I

Research Permit from Ghana Education Service

GHANA EDUCATION SERVICE

In case of reply, the number and date of this letter should be quoted

My Ref. No: GES/SED581/V. /18/09

Your Ref........................................

HEADQUATERS
Ministry Branch Post Office
P. O. Box M-45
Accra

9th October, 2018

HEADS OF SCHOOLS

REGIONAL DIRECTORS:
ASHANTI
VOLTA
NORTHERN

REF: PERMISSION TO COLLECT RESEARCH DATA IN SELECTED SENIOR HIGH SCHOOLS

Approval is granted Mr. Johnson Kofi Kassah a tutor at St. Francis College of Education, Hohoe to collect data in selected Senior High Schools for a PhD programme.

Mr. Kassah is a student of the Kenyatta University, Nairobi, Kenya.

We would be grateful you give him your maximum support.

Attached please find the list of the schools needed.

Thank you.

DR. MRS. ANGELA TENA MENSAH
AG. DIRECTOR SECONDARY EDUC. DIV.
FOR: DIRECTOR-GENERAL
Appendix J

Ghana Senior High School Textile Syllabus

MINISTRY OF EDUCATION
Republic of Ghana

TEACHING SYLLABUS FOR TEXTILES
(SHS 1 - 3)

Enquiries and comments on this syllabus should be addressed to:

The Director
Curriculum Research and Development Division (CRDD)
P. O. Box 2739
Accra
Ghana

Tel: 0302-663968
0302-663951

September, 2010

TEACHING SYLLABUS FOR TEXTILES RATIONALE FOR TEACHING TEXTILES

Textiles, a component of visual art, embraces activities that result in two-dimensional and three-dimensional forms. A society achieves its significance through its production in the visual arts. We as a people are identified through our art works. To develop pride and patriotism in our young people, it is important that our young people acquire love for the cultural and aesthetic values in textiles. The competitive nature of the textiles industry globally has resulted in the suppression and near collapse of our textiles industry. There is the need to promote and diversify our indigenous textiles industry. The textiles syllabus therefore is structured and geared towards the diversification of the industry in order to generate more jobs and alleviate poverty. Presently, the impact of Textiles is felt on education, health, communication, and on the total life style of societies. The advancement in technology has greatly influenced the production of textiles, consequently, textiles invariably makes an impact on the socio-economic development of nations and naturally tends to improve the quality of life in all parts of the world. In Ghana, the combined energy of Textiles, science and technology reinforce our survival and development. To this end, it is important to help our young people to develop the creative skills and capability in Textiles in order to contribute to the development and significance of science and technology. These will also enhance industry, the economy, social well being, culture and indeed, our proud history as a nation.
Appendix K

Structure of Second Cycle Education in Ghana and the Programmes or Courses they Offer

<table>
<thead>
<tr>
<th>Senior High Schools (SHS)</th>
<th>Senior High Technical Schools (SHTS)</th>
<th>Technical &amp; Vocational Institutes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compulsory subjects:</strong></td>
<td><strong>Compulsory subjects:</strong></td>
<td><strong>Technical programmes:</strong></td>
</tr>
<tr>
<td>i. English Language</td>
<td>i. English Language</td>
<td>i. Applied Electricity</td>
</tr>
<tr>
<td>ii. Mathematics (Core)</td>
<td>ii. Mathematics (Core)</td>
<td>ii. Auto Mechanics</td>
</tr>
<tr>
<td>iii. Social Studies</td>
<td>iii. Social Studies</td>
<td>iii. Building Construction</td>
</tr>
<tr>
<td>iv. Integrated Science</td>
<td>iv. Integrated Science</td>
<td>iv. Electronics</td>
</tr>
<tr>
<td>v. ICT</td>
<td>v. ICT</td>
<td>v. Metal Works</td>
</tr>
<tr>
<td>vi Physical Education</td>
<td>vi Physical Education</td>
<td>vii. Technical Drawing</td>
</tr>
<tr>
<td><strong>Elective Programmes</strong></td>
<td><strong>Elective Programmes</strong></td>
<td><strong>Vocational Programmes:</strong></td>
</tr>
<tr>
<td>i. General Arts</td>
<td>i. General Arts</td>
<td>i. Catering</td>
</tr>
<tr>
<td>iii. Agricultural Science</td>
<td>iii. Agricultural Science</td>
<td>iii. Graphic Design</td>
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<td>(GES Syllabi for SHS, 2010)</td>
<td>(GES Syllabi for SHS, 2010)</td>
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<td><strong>General Arts:</strong></td>
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<td>ii. French,</td>
<td>ii. Accounting</td>
</tr>
<tr>
<td>iii. Geography</td>
<td>iii. Geography</td>
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(GES Syllabi for SHS, 2010)
Appendix L

Structure of Education in Ghana

Structure of Education in Ghana

Tertiary Education

University Education

Polytechnic Education

College of Education

Pre-Tertiary Education

Basic Education

Kindergarten

Primary

Junior High School

Second Cycle Education

Grammar Senior High Schools

Senior High/Technical School

Technical & Vocational Institutions or Informal Apprenticeship
Appendix M

Reliability Results obtained from the Pilot Study

Demographic Data

Case Processing Summary

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a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

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Nature of Pedagogical Strategies Used by Ghana Senior High School Textile Teachers in Training their Students

### Case Processing Summary

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<td>I design my own objective of teaching and learning considering textile learner background.</td>
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<td>I demonstrate with all textile training tools/equipment effectively.</td>
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