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Teacher competency in pattern-drafting lessons in senior high schools

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Abstract

The study investigated teachers' levels of competency in paper pattern-drafting in 30 Senior High Schools (SHS) in Ghana. The objectives were to find out the competency levels of the teachers in content knowledge and skills in pattern-drafting; and their challenges in pattern-drafting. Thirty Clothing and Textiles teachers in 30 SHSs were purposively sampled to participate in this study. Data were collected with a questionnaire and observation checklist, analysed to generate frequencies, percentages and means, and presented in tables. Competency level of the teachers in pattern-drafting content knowledge was high ($M = 3.50$) while that of content skill was low ($M = 2.43$). The main challenges of the teachers in pattern-drafting were fit problems with drafted patterns; inadequate tools; insufficient time for pattern-drafting lessons; and students' fear of pattern-drafting due to calculations involved. The researchers therefore recommended that the government should provide enough basic pattern-drafting tools and materials in the schools, timetable slots should be increased by one period in the second term of the second year, and the Ghana Education Service and Ghana Home Economics Association should organise in-service training workshops to help teachers refresh their content knowledge and skills in pattern-drafting.

KEYWORDS: CLOTHING AND TEXTILES, COMPETENCY, KNOWLEDGE, SKILL, TEACHER, PATTERN-DRAFTING, CHALLENGES

Introduction

The clothing industry is one sector of the economy which provides different categories of jobs for many people. From fibre to fabric manufacture, garment production, distribution, use and care, people need to be employed to offer specific services. For the production of quality goods, however, workers have to be trained well for the necessary knowledge and skills. The development of human resource for the clothing industry may be formal in school, or through apprenticeship training under the tutelage of a master/mistress. In Ghana, formal education in clothing production is provided at the basic, secondary and tertiary levels in school as part of the Vocational/Technical program (Boateng, 2012). Many people also learn clothing production skills from tailors and dressmakers through apprenticeship training (Fianu & Acquah-Harrison, 1999).

Though there are different methods of making patterns, paper pattern-drafting is one of the two methods emphasised in the school syllabus for Senior High Schools (SHSs) in Ghana (GES, 2010). Since

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fabrics are expensive, students are taught how to make patterns for the designs of a garment and use the pattern to cut pieces from the fabric instead of cutting directly from the fabric (Adamtey, 2008).

Pattern-drafting in clothing production involves the changing of a two-dimensional piece of paper or fabric into a form that will fit a three-dimensional figure. It is one of the earliest steps in the development of a garment (Camp, 2011). According to Gavor (2011), pattern-making in clothing construction is a process using paper pattern pieces of the various parts of an article in garment production.

Patterns are usually made from paper but may also be made from sturdier materials like cardboard if they need to be more robust in order to withstand repeated use (Whitt, 2010). Gavor (2011) stated that in the drafting method, patterns are made directly from measurements taken from a pre-existing garment, an individual or a body form and using the collected measurements, the pattern of a desired design is drawn directly onto paper. Drafted patterns are drawn with architectural precision, and involve the use of mathematics, angles, curves, and straight lines to make basic patterns (known as a block), which are adapted into desired garment styles (Gavor, 2011).

The block consists of five parts: front and back bodice blocks, front and back skirt blocks, sleeve blocks, front and back trousers/pants blocks and front and back shirt blocks (Forster, 2014). According to Heischberg (2010), a library of slopers (bodice, pants, etc.) will help a designer create any number of patterns.

For effectiveness of any lesson delivery, teacher competency is key. *Competency*, according to the Online Etymology Dictionary (n.d.), means “sufficiency of qualification” as recorded from 1797. Competencies are thus the characteristics of a person that are related to superior performance in a job (Delamare Le Deist & Winterton, 2005). Competency is concerned with meaningful objectives and content of learning that engenders “the personal development of students and position[s] them within the domain of knowledge that can best prepare them to function effectively in society” (Mulder, Weigel, & Collins, 2007, p. 4). As indicated by Mulder et al. (2007) current literature supports “the contention that higher education needs to improve their connection with the needs of employers” and re-examine their program goals and their graduate skill sets to meet requests from the business world. It is clear from the high number of graduate unemployment in Ghana “that a deficit exists in the extent to which higher education can track the development of career-appropriate competencies” (Gosselin, Cooper, Bonnstetter & Bonnstetter, 2013). As pointed out by Gosselin et al. (2013), our future depends on students who possess a set of job-related professional competencies including lifelong learning, problem-solving, personal effectiveness and many others. One of the few studies to address the topic of measurement of Student Learning Outcomes (SLOs) in the US at multiple institutions, claimed that college students were demonstrating little growth in knowledge and skills (Arum & Roksa, 2011).

Pattern-drafting and adaptation requires the use of specific tools for pattern-drafting including: tape measure; seam ripper; fine-point Sharpie marker; tracing wheel; rotary cutter; paper-cutting scissors; tracing paper; cello tape; scotch tape; clear rulers; 12-inch clear plastic rule; metre rule; right-angle ruler; curved rulers; French curve; flexible curve; fashion scale; dressmakers’ square; pencil; erasers; compass; thumb-tacks or office pins; T/L-square; pattern weights; pattern hooks; brown paper; and a flat and wide table (Gavor, 2011; Heischberg, 2010). In addition to some of the above, the SHS Clothing and Textiles syllabus prescribes a clothing laboratory with store, and a large working table for each one to two students. What the SHS syllabus prescribes fall short of what the two researchers indicated but are good enough for the teaching of basic skills in pattern-drafting. Arnold (1985) and Taylor (2016) have observed that sophisticated software is now available for pattern-making.

Zacharia (2003) stressed that being able to offer a wide range of practical lessons in practical-oriented courses as in the case of Vocational and Technical subjects, which include Clothing and Textiles, make a huge difference in student attitude towards the subject, but few schools seem to be able to offer practical lessons, hence making lessons boring and uninspiring to students. Freedman (1997) added that if students have regular laboratory instruction, they develop a better attitude towards a subject. According to Toplis (2012), students are motivated if they do practical work as it enhances a better understanding of theory. Practical lessons can, however, be organised only when

the right tools are available and adequate to offer learners the experiences they require to enable them to develop skills in the subject.

According to Jauch and Traub-Merz (2006), garment production training programs of late are being given attention by the Ministry of Education in Ghana, for learners to have employable skills. These authors added that learners are able to develop competencies not only in pattern-drafting, but also in designing, garment-cutting, assembling and finishing of garments in school. Forster and Adamtey (2009) indicated that students in the University of Education, Winneba for instance, are trained in pattern-drafting to acquire skills to be able to teach at all levels of education in Ghana (basic, secondary, and tertiary). Forster and Ampong (2012) were also of the view that though freehand cutting of garments is popular in Ghana, learning how to develop paper patterns is necessary especially for mass production of garments in the industry. Similarly, one of the aims of the Ghana Education Service [GES] (2010) is to equip students with job skills for clothing production. Pattern-drafting is, therefore, taught in Clothing and Textiles at secondary and tertiary levels of education in Ghana to provide learners with paper pattern skills for garment production.

Teachers, to a large extent, influence what happens in lessons and determine the content and teaching/learning processes (Haladyna, Shaughnessy, & Redsun, 1982; Moroz, 1997). Foskett, Dyke, and Maringe (2004) also stated that young people (students) choose a subject based on the influence of teachers, their interests, careers it offers, and their belief that it will be useful in their future career, among others. Moroz (1997) also held the view that negative attitudes about an area of a study could stem from the way lessons are delivered and how uninteresting and irrelevant topics can be. The garment industry cannot survive without pattern-drafting skills, especially in developing countries where the use of computer applications such as Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) are not common. Designing garments and developing suitable patterns for their production encourages one's creative abilities for public appreciation and increase in patronage of products.

Joseph Rowntree Foundation (2010) argued that children from lower socio-economic backgrounds may be disadvantaged in terms of educational outcomes, when taught in schools with fewer resources. It is again indicated that the negative attitudes of some school leadership towards applied subjects may impact learning outcomes. Foskett et al. (2004) held the view that in vocational education, learners are encouraged and influenced to demonstrate a positive approach and acknowledge the importance of skills and the world of work through their studies. They added, however, that not all schools show commitment to promoting positive attitudes towards learning of vocational skills. Toplis (2012) stated that secondary school students' attitudes towards practical work are generally positive, but their aspirations, attitudes and learning behaviour are affected by lack of resources.

Like other vocational/technical courses, the teaching of Clothing and Textile has never been without problems. According to Olaitan (1986), vocational subjects have been associated with the lower socio-economic backgrounds, and people who have physical or intellectual disabilities. To Molokwu (2010), people are of the view that Home Economics is meant for less academically inclined and many students shy away from it because of the high cost involved in the practical work. Olugbamigbe (2009) observed that lack of tools and materials make teaching and learning of the subject very challenging. According to Nguku (2012), a challenge faced in the teaching and learning of Home Economics was that students were not competent in the practical aspects, probably as a result of inadequate training due to lack of appropriate equipment, infrastructure, or well-trained staff. Allocation of time for practical work to ensure that techniques needed to acquire skills are well-taught is also inadequate (Finch & Crunkilton, 1999). As stated by Boateng (2012), more time is required for Vocational and Technical lessons in schools.

Paper pattern-drafting and adaptation is in the SHS Clothing and Textile syllabus and students are expected to be trained to acquire skills in it and use the patterns to produce garments in school as coursework (MOE, 2010). When Home Economics teachers meet during workshops and conferences, pattern-drafting always comes up as the most challenging topic for many teachers. The 2008 Educational Reform of Ghana (GES, 2010) requires that students should have acquired occupational skills by the end of the SHS program to enable them to apply their knowledge and skills in the industry. Fashion designers are at an advantage if they can make their own patterns and many students who opt for Clothing and Textiles at SHS have indicated they wanted to be fashion designers and set up their own garment industries after school (Forster, Quarcoo, Ashong, & Ghanney, 2016). It will be a

disadvantage for them to leave school without acquiring pattern-drafting skills. Some researchers have stated that many students who wish to take up clothing production as their career go into apprenticeship training to develop their garment-cutting skills better before establishing on their own (Forster & Ampong, 2012; Forster et al., 2016; Wovenu & Forster, 2009). The objectives of the study were to: find out Clothing and Textiles teachers competency levels in pattern-drafting knowledge and skills; and the challenges teachers face in the delivery of pattern-drafting and adaptation lessons.

Methods

The purpose of this study was to explore teachers' ability to teach pattern-drafting lessons effectively in selected SHSs in Ghana. Three regions were conveniently sampled out of the ten regions of Ghana to participate in the study. In each of the regions, ten SHSs which offered Clothing and Textiles were randomly selected to participate in the study. The Clothing and Textiles teacher in each of the selected schools was automatically selected to participate in the study. Thirty teachers of Clothing and Textiles, all of whom had a minimum an undergraduate degree in Home Economics or Fashion Technology Education were, therefore, purposively sampled from the 30 SHSs.

Data were collected from the respondents with a questionnaire and observation checklist. The teachers were asked to rate their levels of competency in content knowledge and skills in Likert scale questions which ranged positively from *Very High* (4), *High* (3), *Low* (2) and *Very Low* (1), while open-ended questions were used to collect data on the challenges they were facing in their pattern-drafting lessons. The researchers also observed drafted patterns made by students and the constructed garments, to determine alignment with the teachers' answers to questions on effectiveness of their pattern-drafting lesson deliveries. Data gathered for the study was analysed manually to generate frequencies, percentages, means and quotes and presented in tables where appropriate.

Findings and discussion

Teacher competency levels in pattern-drafting content knowledge and skills

For teachers to be able to deliver pattern-drafting lessons effectively, they have to be competent in both theory and practical skills. Teacher competency levels in content knowledge and skills in pattern-drafting in the selected SHSs are presented in Table 1.

Table 1 Teacher competency in paper pattern-drafting knowledge and skills

Variable	VH 4		H 3		L2		VL1		Total		Weighted
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	M
Content Knowledge	19(76)	63.3	7(21)	23.3	4(8)	13.3	0(0)	0	30(105)	100	3.50(H)
Content Skills	6(24)	20	7(21)	23.3	11(22)	37	6(6)	20	30(73)	100	2.43(L)

Weighted frequency scores in parentheses

The results of the study generally show that the teachers indicated a high level of competency ($M = 3.50$) in knowledge of pattern-drafting, however, the results indicate low skills ($M = 2.43$) in pattern-drafting. Table 1 indicates that majority of the teachers (97.3%) reported that their level of competency in content knowledge was high. It is worrying that the teachers' level of competency in pattern-drafting skills was generally low, this may explain why some Clothing and Textiles students go into apprenticeship training in garment-making skills after formal education before they can start their own small-scale garment production (Wovenu & Forster, 2009).

Boateng (2012) indicated that Vocational Technical Education (VTE) requires skilled and proficient teachers and there is the need for constant in-service training for teachers to upgrade their skills. One of the challenges listed by Nguku (2012) in the teaching and learning of Home Economics is the issue of availability of well-trained teachers for the job.

For effectiveness of any lesson delivery, teacher competency is key. Competencies mean sufficiency of qualification (Online Etymology Dictionary, n.d.) and are the characteristics of a person that are related to superior performance in a job (Delamare Le Deist & Winterton, 2005). Teachers cannot teach pattern-drafting skills effectively if their competency levels are not high.

Clothing and Textiles students may, therefore, not acquire the occupational skills in pattern-drafting for employment by the end of the program as expected in the 2008 Educational Reform of Ghana (GES, 2010) Since many students who opt for Clothing and Textiles at SHS indicated they wanted to set up their own garment industries after school (Forster, Quarcoo, Ashong, & Ghanney, 2016), teachers have to ensure that the right pattern-drafting skills are taught well in SHS because it will be a disadvantage for students to leave school without the required skills. Research in the United States of America also found that college students were demonstrating little growth in knowledge and skills (Arum & Roksa, 2011). It is possible that teacher education institutions who train Clothing and Textiles teachers are not addressing the pattern-drafting skills needs of trainee teachers adequately.

A teacher may be highly competent in both content knowledge and skills but cannot teach pattern-drafting lessons competently due to some other challenges.

Challenges of teachers in pattern-drafting lessons in SHS

Teaching and learning resources for paper pattern-drafting

Apart from the level of competency in practical subjects, teachers need the right tools to be effective in their lesson deliveries. Consequently, the teachers were asked to provide information on available teaching and learning materials and their adequacy in their schools.

Table 2 presents facilities available in the schools for pattern-drafting practical lessons. None of the 30 schools had *all* of the listed items. The only tools/materials available in all the schools were tape measures, paper-cutting scissors and brown paper. Some teachers explained that students, not the government or the schools, provided such items, unlike Science or ICT lessons. Clothing and Textiles teachers cannot also teach pattern-drafting lessons well for students to acquire the necessary skills if they do not have the right facilities. Gavor (2011) and Heischberg (2010) emphasised that facilities, tools and materials are essential in pattern-drafting and both teachers and students should have them to ensure competency. Each of the tools has a specific use in pattern-drafting. For instance, Arnold (1985) explained that the large tables allow papers to be spread during the drafting process and Forster (2014) stated that a good tape measure should be used to take body measurements and transfer the measurements on the pattern paper. As Arnold (1985) stated, the right facilities, tools and materials serve as an aid to a given task in pattern-drafting. Nguku (2012) advised that for proper acquisition of skills in Home Economics, therefore, there should be the right tools and material for teaching and demonstration. Each teacher claimed they had their own tools for demonstration but each student should also have the opportunity to learn how to use the tools through practice. This cannot happen if tools are not available or are inadequate in the schools. The teachers explained that students are supposed to provide their own brown paper, pins, tape measures and paper-cutting scissors, but not all students are able to provide them.

The list of equipment for pattern-drafting provided by teachers of what they have in their schools falls short of many items on lists provided by Gavor (2011) and Heischberg (2010). The researchers observed that even the few basic tools listed in the school syllabus were either not available or were available but inadequate to provide all students with the opportunity to learn how to use them. Olugbamigbe (2009) also identified inadequate tools and equipment for Clothing and Textiles as a challenge in a study. Though education is responsible for training students to acquire the necessary skills, knowledge and competencies to enter the clothing industry (Reda, 2015), the Clothing and Textiles teacher cannot deliver that service effectively where basic facilities for practical lessons are either not available or are inadequate, whether they are competent or not.

As stated in MOE (2010), all Vocational and Technical programs, which include Clothing and Textiles, need resources for proper implementation of programs; otherwise, they will be taught theoretically and students will not benefit from the programs for the objectives to be achieved. It is therefore suggested that all schools should have a stock of minimum equipment to be able to implement the syllabus and students should also be encouraged to own some small tools to help them. According to the teachers in this study, the government and students do not provide the necessary teaching tools and materials for paper pattern-drafting lessons in the schools.

Table 2 Availability and adequacy of teaching and learning facilities

Item	Available		Adequate Quantity	
	Freq.	%	Freq.	%
Paper-cutting scissors	30	100	28	93.3
Tape measure	30	100	23	92
Brown paper	30	100	24	80
Practical room	25	83	25	83
Large tables	21	70	19	63.3
Dressmakers' pins	21	70	21	100
Metre rule/yard stick	16	53	5	31.3
Straw Board	12	46.9	7	58.3
French curves	12	46.9	6	50
L-square	12	46.9	6	50
Thumb/drawing pins	12	40	12	100
Dressmakers' carbon	8	26.7	2	25
Pivot pins	6	20	2	33.3
Cello tape	5	16.7	5	100

Joseph Rowntree Foundation (2010) argued that most students who endure the harsh learning conditions usually attain poor educational results. If the schools are well-resourced with the necessary tools and materials for pattern-drafting, learning conditions may improve motivation of teachers and students and facilitate drafting skill acquisition among students. The level of support for practical work is very worrisome and a cause for concern since it affects the teaching and learning and undermines practical subjects.

Transition of students in Clothing and Textiles

According to Olaitan (1986), vocational subjects have been associated with lower socio-economic status students, and people who have physical or intellectual disabilities. Molokwu (2010) added that people are of the view that Home Economics is meant for students who may be less academically inclined, hence, many students have negative attitude towards Clothing and Textiles. However, in this study, many of the teachers indicated that students wanted to learn how to make patterns for their self-garments and were therefore eager to draft patterns. This is shown in the results where all the teachers surveyed said their students showed positive attitudes towards Clothing and Textiles, and pattern-drafting specifically. Toplis (2012) also indicated that secondary school students' attitudes towards practical work are generally positive. Forty percent of teachers in this study mentioned that some students did not choose this subject voluntarily so did not show interest initially, but were more engaged and active in class towards the end of the first year when they started experiencing the benefits of the subject. Perhaps some students avoid it at the stage of subject selection but develop positive attitudes towards it when they start learning it and begin to realize it is not what some people think it is. Foskett et al. (2004) stated that students' choice of a subject could stem from their interest in the subject, and their belief that it will be useful in their future career. Students who are interested in a subject will be very much disappointed if their teachers are not able to meet their skill expectations.

Time allocation for pattern-drafting

Another challenge stated by teachers was limited time allocation for pattern-drafting. A little more than half the teachers (53.3%) complained that the time was too short for practical lessons because pattern-drafting is time-consuming. Time allocation for Clothing and Textiles on school timetables is six periods of 40 minutes each in a week, as per the SHS syllabus. If teachers are finding it difficult to organise successful lessons to provide students with the relevant skills within that time, then it may be necessary to adjust the timetable slot on the syllabus.

Fit of drafted patterns

All teachers surveyed further indicated that some students had difficulty with the taking of body measurements accurately, and found it difficult to divide, add or subtract accurately as they transferred measurements to create the patterns on paper; students also had a fear of pattern-drafting lessons (20%), while many were not able to draft basic block patterns to fit with instructions provided in the textbooks (70%). The fit of patterns cannot be good if body measurements are not well-taken. This study confirms Nguku's (2012) assertion that students were not competent in practical work. Some teachers (36.6%) commented that "[t]he fundamentals are not well grasped by the students in Junior High School, making pattern-drafting challenging to the students in SHS".

As to whether they were able to teach pattern-drafting successfully in their schools, all the teachers expressed some level of success and provided evidence of drafted patterns made in class and articles cut with patterns shown in Table 3.

Table 3 Articles cut with drafted patterns made by students of the teachers

Article	Frequency	Percentage
Blouse	29	96.67
Baby's dress	28	93.33
Shirt	2	6.67
Skirt	2	6.67

It is stated in the 2010 syllabus (GES, 2010) that students should design different garments and use their block patterns to develop them for blouse, shirt, skirt, straight dress and sew self-garments as a course project. All these require the making of patterns and it is only teachers with high levels of competency in pattern-drafting who can help the students to acquire those skills. In this study, the researchers observed that many basic block patterns of the students were not of a high standard. They did not have well-defined curves at armholes, necklines and hemlines; front and back necklines had the same depths; across back, across chest and bust were extremely wide; waistlines (dress and skirt) were undefined; and darts were disproportionately distributed in shaping curved areas. Teachers complained that their students were usually not able to complete the practical lessons in class and so completed them as homework without their supervision, due to the limited time. It is apparent that learner competency in pattern-drafting skill acquisition was generally low.

It is stated in the GES (2010) syllabus that practical course project work should be assessed to form part of the school-based assessment in West Africa Senior Secondary Certificate Examination (WASSCE). Hence, students who are not able to acquire the drafting skills well enough to enable them to make good patterns for their projects, are likely to score low grades in Clothing and Textiles. In addition, they may have to go into apprenticeship training after school if they want to take up garment-making careers later in life.

Conclusions

Teachers' competency levels were high in pattern-drafting content knowledge but low in the content skills. Since the skills are necessary to enable learners to work in the garment industry, it is necessary for teachers to have high levels of competency in pattern-drafting skills. The main challenges of the teachers in pattern-drafting were lack of basic facilities; insufficient time for pattern-drafting lessons; and students' fear of pattern-drafting.

Biographies

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