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ARTICLE

Capacity Building Needs for Manual and Computer Assisted Teaching of Pattern Drafting for Entrepreneurship in Tertiary Institutions in Nigeria

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ABSTRACT

This study investigated the capacity building needs for manual and computer assisted teaching of pattern drafting for entrepreneurship in tertiary institutions in Nigeria. The study was conducted and guided by two research questions and two hypotheses. This study adopted an ex-post facto research design. The population for the study consisted of 131 Home Economics lecturers from the Universities, Polytechnic, and Colleges of Education in South East Nigeria. The entire population was studied because of its manageable size, hence there was no sampling. The results of this study showed that the Home Economics lecturers are competent in drafting patterns using manual method. Technical skills required for lecturers of Home Economics to advance from manual to computer-assisted teaching of pattern drafting were identified. They include ability to grade patterns, ability to use software packages, and ability to discuss procedures of pattern drafting among others. Based on the findings, it was recommended among others that computer assisted teaching of pattern drafting should be incorporated and applied by Home Economics lecturers to ensure that students acquire technical skills that will enable them to enter into entrepreneurship.

1. Introduction

During clothing construction, the method of free hand cutting or pattern drawing can be used. An effective pattern is just as crucial to a dressmaker's achievement as a skilled architect's blueprint is to the construction of a house. A pattern is a sheet of paper that has been designed, cut, and sized. It is used to cut out fabric parts that are needed to make clothes (Igbo & Iloeje, 2003).[15] Using patterns in clothing creation is crucial since it provides the designer confidence while cutting fabric. Using patterns, whether by hand or on a computer, encourages creativity in design and is the most effective method of producing good fitting clothing (Shailong and Igbo, 2009).[26]

Therefore, the term "manual method of pattern drafting" describes the process of drawing a pattern on paper using a person's body measurements and instructions. The fabric pieces needed to make an outfit are cut out using the drafted pattern parts. Igbo and Iloeje (2003)[15] state that there are several techniques for manual pattern drawing. They described the procedures to be followed, which included modeling, knock-off design, grading from a set of patterns, flat pattern, and drafting approaches.

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The manual approach has been the norm for teaching and learning pattern drawing in Nigerian academic institutions. This is a slow process that takes a lot of time, patience, and imagination. Bob-Eze and Arubayi (2022)[8] noted that practical clothing and textiles take more time and demand more technical skills. As a result, some instructors and students think pattern drafting is a challenging topic. Consequently, an instructor who finds pattern drawing challenging cannot help students develop such practical abilities. Arubayi (2010)[4] argues that a teacher cannot give away what he does not have, the teacher in this case cannot influence the abilities required for mass manufacturing. Because such a system does not promote mass manufacturing, it is unable to meet the demand for clothing. Generally speaking, mass production refers to the creation of large-scale commercial items. The use of computer software in pattern drawing instruction must be introduced in order to accomplish this mass manufacturing aim.

1.1 Literature Review

1.1.1 Manual Method of Pattern Drafting

Manual Methods of Pattern Drafting: A pattern is a sheet of paper that has been designed, cut, and sized. It is used to cut out fabric pieces for making clothes (Igbo and Iloeje, 2003).[15] Working with patterns consists of three primary components, according to Kindersley (1999): [18] The envelope, instruction, and pattern. The package also includes two additional parts printed with clothing images and the necessary information to choose the right pattern size and amount of fabric for sewing. The pattern's usage guidelines and the significance of its many marks are explained in the manual. The printed full-size pattern pieces, either single- or multi-pattern, are referred to in the issue sheets. According to Varney (1980),[28] designs are necessary for designing dresses "to obtain a better fit and to save material." Aldrich (2006)[2] defends the usage of block designs in the apparel industry by pointing out that although blocks can be produced to fit a given figure using personal measurements, they are often constructed to standard (average) measures for particular groups of individuals. Igbo and Iloeje (2003),[15] however, distinguished between several forms of manual pattern drafting, including the knock-off design approach, drafting method, flat pattern method, grading method, and modeling or draping method.

Modeling or Draping Method: The modeling or draping method is a creative way to create patterns for clothing by fitting fabric to a dress form or model's contours (Hollen, 1981).[13] Aldrich (2002)[1] reiterates Hallen's opinion by pointing out that the designer can utilize less costly fabric that has a comparable personality to the primary material. Although Aldrich's method is costly and time-consuming, it is inspirational since it allows designers and dressmakers to get the intended results of their work immediately and does away with fitting challenges.

The Knock – off design method: The knock-off design approach, which entails purchasing the company's best-selling clothing products, pulling out the seams, and replicating or knocking off the design, is a highly helpful tactic. It is a method of copying the style and fit of an item of clothing that other firms are selling successfully or are in style (Igbo & Iloeje, 2003).[15] Since garment designs are not protected by copyright, this practice is lawful. They went on to describe several techniques for creating patterns utilizing the knock-off design process in the following ways.:

- Taking a garment apart at seam lines to copy the shapes.
- Using muslin and soft lead pencil to rub off the shape of each pattern piece.
- Using paper and tracing wheel to copy each garment piece.
- Using a tape measure to measure simple garment shapes and drafting patterns to these dimensions.

Modifying from a set of pattern (grading): By raising the pattern to create larger sizes or lowering the pattern to create smaller sizes, the approach of "modifying from a set of patterns" may be used to produce patterns in various sizes. Slash and spread or slash and overlap approaches can be used to modify and grade patterns (Igbo & Iloeje, 2003).[15] They went on to say that sizes may be increased or decreased using the slash and spread or slash and overlap techniques, respectively. The manual grading of every design takes a lot of time. A proficient pattern grader is needed. These days, a lot of clothing makers use computers to assess designs. At the push of a button, the computer may be programmed with grading rules to precisely grade the pattern to the required sizes (Mackorhill, 2004).[21]

The Flat Pattern Method: The flat pattern approach begins with a pre-made basic block pattern from a store or a custom-drafted basic block pattern. According to Ezike (2012),[12] this technique makes use of precise measurements made on a dress form or on a human. The flat pattern approach involves manipulating designs to create a pattern for a certain style. This technique's moniker, "flat pattern," suggests that it be used on a level surface.

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The drafting method: An engineering method for creating patterns is the drafting process. This approach is predicated on a set of guidelines. The intended pattern lines are established using the body dimensions. The precision of the measurements in drafting will determine the correctness of the design. Few designers utilize the drafting approach since it is unworkable for producing constantly changing designs, particularly in the female fashion market, due to its reliance on a table of precise dimensions. Basic foundation designs for the front and back bodice, sleeves, and front and back skirt are part of the skill of drafting patterns. The dressmaker may then create the desired style with these components.

According to Okorie (2000),[22] two essential qualities of clothing designers are originality and measuring expertise. According to Anikweze (2013),[3] drafted patterns typically consist of five pieces: the bodice front, bodice back, skirt front, skirt back, and sleeve. These designs are based on basic patterns. The sloper, a cardboard replica of the basic pattern, has seam allowances and dart sections removed. For designing reasons, a person can tie on a muslin shell, which is a bodice or skirt fashioned from a basic pattern.

1.1.2 Computer-aided Design

According to Hwang (2001),[14] using a computer entails using hardware and software such a 3D scanner and 2D photos, which are digitally input programs that take measurements, create, draft patterns, and assemble clothing for customized manufacture. Precisely measuring the body is the first stage in creating tailored apparel. At this point, the user of the computer-aided manufacturing system can choose any approach for gathering body dimensions. Either 2D photos or the 3D scanner may be used to gather the body dimensions. The scanner must be calibrated using a regular technique before scanning, and noise is reduced by carefully controlling the illumination. A person's picture is captured by the scanner with hundreds of thousands of data points, and the program automatically extracts dozens of metrics that are useful in many contexts. Skilled pattern designers often create clothing designs based on measurements and observations. The advancement of Computer Aided Design (CAD) technology has led to the creation of computer software that can produce garment patterns more efficiently (LU and Wang, 2008).[20] Clothing designs can be constructed computer-aided based on the needed measurement's mathematical expression. In addition, the computer-generated human models make it easier to see how the created clothing would fit in a virtual setting.

A computer may easily be used to store and retrieve data about human models. Without taking another measurement, the scanner may quickly generate a different kind of garment design. Following the collection of body proportions by 2D photographs, 3D scanning photos, direct input, and auto, Computer Aided Design (CAD) will be used to create electronic drawings of the patterns. The system displays a graphical preview of the designs and their requirements as soon as the pattern sketching is complete. The drawing will be transferred into Drawing Exchange Format (DEF), which is compatible with Computer Numerical Control (CNC) laser cutting equipment, if the user is happy with the results and gives the go-ahead. The cloth cutting procedure will come next, and then the pattern components may be produced automatically and quickly. Following that, they will be prepared for the sewing, fitting test, and last adjustment steps of the production process (Patrick, 2006).[25] The use of computer-assisted instruction in pattern drawing for apparel and fabric cutting has made significant progress. As a result, time and money savings in apparel mass production have improved. Stated differently, Nigeria urgently needs to implement computer-assisted methods in pattern drafting instruction in order to meet the goals associated with the country's sustainable development.

1.1.3 Teaching and Learning Pattern Drafting

Azonuche (2015)[6] asserts that teaching is a deliberate and rational act. Since instructors usually have a purpose when they teach, mostly to enhance learning, it is a deliberate act. Since instructors impart beneficial knowledge to their pupils, teaching is an essential profession. According to Liao (2007),[19] every teaching action is intended to result in learning; hence, the greatest indicator of an effective teaching strategy is the quantity of learning that takes place and is manifested in the learner's altered behavior. Therefore, it is the duty of the home economics lecturers to instruct pattern drafting utilizing the new computer technology; consequently, in order to educate pattern drafting, it is necessary to develop capacity developing competency in the new computer technology. To be competent is to be able to perform a task well. According to Ikeoji (2018),[16] a person is considered competent if they possess the information, abilities, and attitudes necessary to carry out a certain work or employment. Conversely, if an individual is unable to adequately exhibit the information, abilities, and attitudes needed for instruction, there is a gap in their skill set that indicates a lack of competence. Building capability is necessary for the individual to close this gap.

Retraining serving teachers to acquire a particular skill or competency, or to improve their overall performance

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ability, is known as capacity building. As per Olaitan, Alaribe, and Ellah (2009),[23] capacity development is an endeavor to enhance an individual's capability to execute a task or job. It is focused on optimizing an individual's current performance to boost productivity. The goal of capacity development for home economics instructors is to raise their level of knowledge, abilities, and attitudes so they can work more productively and accomplish the learning objectives with greater competence.

More computer-assisted instruction is needed to supplement the present manual technique of teaching pattern drawing, particularly in this era of information and communication technology (ICT). Actually, using computers to replace the current pattern drafting teaching approach will promote innovation and assist establish sustainable industry. In the field of educational technology, computer-assisted teaching, the use of computers and software programs to teach concepts or skills, is crucial (Wilder, 2006).[29] It is the end result of a meticulous development process that yields a repeatable series of educational experiences that have been shown to result in quantifiable and reliable student learning. A teacher and student may not always have physical touch while using computer-assisted education, which is an electronic method of information sharing and transfer. Computer-Aided Instruction (CAI) is based on the idea of computer-assisted teaching and learning. Using a computer and a graded series of regulated stages, CAI is a way to introduce new material to pupils (Liao, 2007).[19]

One may create a lot of well-fitting clothes in big quantities by using computer-assisted drafting patterns. The availability of computer-aided design will enable large-scale clothing manufacture, which will stimulate entrepreneurship. This will gradually lessen the amount of clothing that is imported or smuggled into the nation, protecting our foreign reserve. The need for computer-assisted instruction in pattern drawing for entrepreneurship has grown in Nigeria for a variety of reasons. Numerous uniformed agencies, like the army, police, customs, navy, and security firms, need their uniforms to be produced in bulk and in huge quantities for their employees. The same holds true for elementary and secondary schools, which must produce uniforms in large quantities for their students. It is becoming increasingly obvious that the manual way of producing clothing is no longer able to match the demands of clients for the entrepreneurial creation and supply of these items at the appropriate time.

Lack of the necessary computer abilities for pattern drawing might be caused by a variety of circumstances. It is necessary to evaluate the instructors' levels of proficiency. Assessment is necessary for judging the value of anything or an individual's performance on a skill based on measurement, claim Azonuche and Anyakoha (2018).[7] Information on the skill level required for an acceptable or target standard will also be provided by the assessment. The discrepancy between the required performance standard and the instructors' actual performance level will reveal a capacity gap that must be filled through capacity building initiatives. Consequently, in order for home economics students to have a solid foundation in pattern drafting, their instructors must have had the necessary, pertinent abilities to enable them to successfully teach in a way that fosters entrepreneurship.

According to Bob-Eze (2010),[9] entrepreneurship is the process by which people combine material and human resources to produce things and services that people want. According to Atakpa (2011),[5] entrepreneurship is the process by which business owners establish and maintain their ventures. According to Egbule (2018),[11] entrepreneurship may also be defined as a human-creative act that involves an individual's effort in seeing potential business possibilities in their surroundings, managing such chances, and taking advantage of them. The government of Nigeria has recognized and prioritized entrepreneurship as the most significant policy among other policies ever introduced, including the National Economic Empowerment and Development Strategies (NEEDS), the Mass Mobilization for Self-Alliance (MAMSA), and others, in order to address the unfavorable conditions faced by her citizens. This initiative is known as the "Nigeria Policy Priority" program. There's a direct connection between entrepreneurship and teaching pattern drawing at tertiary institutions. Mass manufacturing of fashion items will be made possible by the use of computer-aided instructions, or CAI, in pattern drawing for garment construction. Any vital human need that is produced in large quantities has the effect of increasing market supply, which naturally helps to lower the price of the good and creates more work possibilities for people. One example of this is the greatest clothing factory in the nation right now, which was founded not too long ago in Calabar is Nigeria's extensive imports of Chinese clothing and other goods is what drives China's mass manufacturing, which inevitably drives China's industrialization.

1.2 Theoretical Framework

Roger Kaufman's (1979)[17] Need Assessment Theory served as the study's compass. As part of the needs assessment process, gaps in findings are found, explained, and prioritized for attention. The results (or ends) that arise from an organization's inputs, outputs, or processes

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are the focal point of this specific results emphasis (the means to the goal). According to Kanufman, the identification of a true need can only occur when it is done so without the hasty selection of a solution (processes being characterized as means to an end unto themselves). According to Kanufam, the real requirement is the disparity between outcomes, hence the first step in doing a quality needs assessment is determining the present results. After a need has been determined, a solution that aims to close the gap might be chosen. It is all about change, and knowing what to change into and what to shift from is crucial. This research urges needs assessment to evaluate instructors' needs in developing lesson plans. Because it emphasizes the development of human resources through educational activities for skill use, this theory is pertinent to the research being done. The attainment of sustainable development goals and the development of entrepreneurship abilities among students are contingent upon their participation in pattern drafting under the guidance of capable professors.

1.3 Purpose of the Study

The main purpose of the study is to access the capacity building needs for manual and computer assisted teaching of pattern drafting for entrepreneurship in tertiary institutions in Nigeria. Specifically, the study:

1. determined the extent to which Home Economic lecturers are competent in teaching pattern drafting using manual method in tertiary institutions in Nigeria.

2. ascertained technical skills required for Home Economics lecturers to advance from manual to computer assisted teaching of pattern drafting for entrepreneurship in tertiary institutions in Nigeria.

1.4 Research Questions

The study focuses on the following research questions:

1. To what extent are Home Economics lecturers competent in teaching pattern drafting using manual method in tertiary institutions in Nigeria?

2. What are the technical skills required for Home Economics lecturers to advance from manual to computer assisted teaching of pattern drafting for entrepreneurship in tertiary institutions in Nigeria.

1.5 Research Hypotheses

The study tested the following hypotheses at 0.05 level of significance:

$H0_1$: There will be no significant difference between the mean responses of Home Economics lecturers in Federal and State tertiary institutions on the extent to which they are competent in teaching pattern drafting using manual method in tertiary institutions in Nigeria.

$H0_2$: There will be no significant difference between the mean response of Home Economics lecturers in the Universities, Polytechnic and Colleges of Education as regards the technical skills required to advance from manual to computer assisted teaching of pattern drafting for entrepreneurship in tertiary institutions in Nigeria.

2. Materials and Methods

An ex-post facto research design technique was used in this study. The South East geopolitical zone of Nigeria is the study's primary emphasis. This zone is composed of the five states of Abia, Anambra, Ebonyi, Enugu, and Imo. The population of the research comprised all home economics instructors in all public tertiary institutions in South East Nigeria. There are 14 public higher education institutions in South East Nigeria that provide home economics education as of the time of the research: 5 universities, 1 polytechnic, 8 colleges of education, and 131 home economics instructors. There was no sampling since the 131 professors' population was studied in its whole due to its manageable size. The researcher created a structured questionnaire for the study called the "Capacity Building Needs for Manual and Computer Assisted Teaching Questionnaire (CBNMCATQ)". The tool was validated by three professionals. Regarding the things' suitability and use, they combined their thoughts and opinions. 29 Edo State home economics professors were able to determine the instrument's reliability at 0.84 by using the Cronbach's Alpha method to assess the internal consistency of the measure. In order to assess the data and respond to the research inquiries, percentages, means, and standard deviations were utilized. Null hypoyhesis 1 was tested using t-test while null hypothesis was tested 2 with One Way Analysis of Variance (ANOVA) statistic with a significance threshold of 0.05.

3. Results

3. 1 Bio-data

Table 1 showed that all the respondents were females. Abia State 33 (25%) had the highest number of lecturers while Imo State had only 19 (15%). By the type of institution, the Federal Universities had the highest 37 (28%) while the Polytechnic had least number of lecturers 9 (7%). By qualification 78 (60%) of the respondents had Doctorate Degree, 42 (32%) Master's Degree and 11 (8%), Bachelor's Degree. 61 (46%) of the respondents had teaching experience between 11-20 years, 34 (26%) had 21 and above years of teaching experience, 22 (17%) had

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between 6-11 years while 14 (11 %) had less than 5 years of teaching experience.

Table 1: Demographic characteristics of Home Economics Lecturers in South East, Nigeria (N=131)

Demographic characteristics		Frequency	Percentage (%)
Sex	Male	Nil	0
	Female	131	100
State	Anambra	28	21
	Imo	19	15
	Abia	33	25
	Enugu	31	24
	Ebonyi	20	15
Type of Institution	Federal University	37	28
	State University	17	13
	Polytechnic	9	7
	Federal College of Education	33	25
	State College of Education	35	27
Highest Qualification	Bachelors Degree	11	8
	Masters Degree	42	32
	Doctorate Degree	78	60
Teaching Experience	Less than 5 years	14	11
	6-10 years	22	17
	11-20 years	61	46
	21 and above	34	26

Research Questions

Research question 1: To what extent are Home Economics Lectures competent in teaching pattern drafting using manual method in tertiary institutions in Nigeria?

The result in table 2, showed that respondents from the Federal Universities had mean ($\bar{x}$) sore range of 1.89 and 2.43, for items 41 and 45 which was below the cut-off mark of 2.50, this was regarded as low extent, while items 20-40, 42-44 had mean ($\bar{x}$) score range of 2.57-3.89 and a grand mean ($\bar{x}$) score of 3.02 which were above the cut-off mark of 2.50 this was taken as high extent. In the State Universities, items 20-40, 42, 43 and 45 had a mean ($\bar{x}$) score of 3.02 which were above the cut-off mark of 2.50, therefore, the decision was taken as high extent, while items 41 and 44 had mean ($\bar{x}$) score range of 1.88 and 2.47 which were below the cut-off mark of 2.50 was taken as low extent. In the Polytechnic, items 21-35, 41, 44 and 45 had a mean ($\bar{x}$) range of 1.78-2.44 which was below the cut-off mark of 2.50 and was taken as low extent, while items 20, 36-40 and 42-43 had a mean ($\bar{x}$) range of 2.56-3.89 and a grand mean ($\bar{x}$) of 3.01 which was above the cut-off mark of 2.50 and was considered as high extent. In the Federal Colleges of Education, items 41, 42 and 44 had mean scores range of 1.67-2.45, which was below the cut-off mark of 2.50 and was taken as low extent. While, items 20-40, 43 and 45 had mean ($\bar{x}$) score range of 2.61-3.88 and a grand mean of 2.50 and was taken as high extent. In State Colleges of Education, item 31 had a mean score of 1.89, which was below the cut off mark of 2.50 and was taken as low extent. Items 20-30, 32-45 had mean ($\bar{x}$) score range of 2.60-3.89 and a grand mean ($\bar{x}$) of 3.13 which were above the cut-off mark of 2.50 and was taken as high extent. However, all the respondents agreed that lecturers of Home Economics had high competency in pattern drafting using manual method in Tertiary Institutions.

Research Question 2: What are the technical skills required for Home Economics lecturers to advance from manual to computer assisted teaching of pattern drafting for entreneurship in tertiary institutions in Nigeria.

The result in table 3 showed that the respondents in the Federal Universities agreed to items 78 – 98 with mean ($\bar{x}$) scores that ranged from 2.70 – 3.62 and a grand mean ($\bar{x}$) of 3.26 as the technical skills required for lecturers of Home Economics to advance from manual to computer – assisted teaching of pattern drafting for entrepreneurship. The respondents in the State Universities agreed to items 78 – 92, 94, 96 – 98 with mean ($\bar{x}$) scores range of 3.06 – 3.82 and a total grand mean ($\bar{x}$) of 3.27 which were above the cut-off mark of 2.50 thus, are the technical skills required for lecturers of Home Economics lecturers to advance from manual to computer – assisted teaching of pattern drafting for entrepreneurship. While items 93 and 95 with mean($\bar{x}$) scores range of 1.53 – 2.18 were below the cut-off mark thus, respondents disagreed to the items.

The respondents from the Polytechnic agreed to items 78 – 91, 93 – 94, and 96 – 98 with mean ($\bar{x}$) scores ranging from 3.00 – 4.00 as the technical skills required for lecturers of Home Economics to advance from manual to computer – assisted teaching of pattern drafting for entrepreneurship while items 92 and 95 with mean ($\bar{x}$) scores of 1.00 and 2.44 respectively.

These scores were below the cut-off mark of 2.50 thus the respondents disagreed that they were not training skills required. The respondents from the Federal Colleges of Education agreed with items 78 – 90, 92 and 94 – 98 with mean ($\bar{x}$) scores ranging from 2.91 – 3.64 and a grand mean ($\bar{x}$) of 3.18 as the technical skills required for lecturers of Home Economics to advance from manual to computer – assisted teaching of pattern drafting for entrepreneurship while items 91 - 93 with mean ($\bar{x}$) score ranging from 2.24 – 2.36 which were below the cut off mark of 2.50 were disagreed. The respondents in State Colleges of Education agreed to items 78 – 94 and 96 –

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Table 2: Mean ($\bar{x}$) scores and standard deviation of the responses of lecturers of Home Economics in Tertiary Institutions in South East, Nigeria on their competencies in teaching pattern drafting using manual method.

	Pattern Drafting Bodice Block (Front and Back)	N = 37 FU		N = 17 S U		N = 9 Polytechnic		N = 33 F C E		N = 35 S C E	
		$\bar{x}$	R	$\bar{x}$		$\bar{x}$	R	$\bar{x}$	R	$\bar{x}$	R
1.	**Front:** Draw a vertical line equals front length plus 2'. Measure horizontal line equals ¼ bust measurement. **Back**: Draw a vertical line equals back length plus ½'. Measure horizontal line equals ¼ bust measurement.	2.81	HE	2.83		2.78	HE	2.79	HE	3.54	3.54
2.	**Front:** Square lines and label ABCD, measure up 1½' from waist point CD and mark C_1 and D_1. **Back**: Square lines and label ABCD, measure up ½' from waist point CD and mark C_1 and D_1.	2.70	HE	2.71	HE	2.44	LE	2.70	HE	2.71	2.71
3.	**Front**: Find centres of the square, divide horizontally and rule a line across from AB-CD. **Back**: Find centres of the square, divide horizontally and rule a line across from AB-CD.	3.14	HE	3.24	HE	2.36	LE	3.24	HE	3.14	3.14
4.	**Front:** Divide the upper rectangle into four equal parts vertically and horizontally. **Back**: Divide the upper rectangle into four equal parts vertically and horizontally.	3.24	HE	3.18	HE	2.37	LE	3.15	HE	2.89	2.89
5.	**Front:** Divide the first square on upper right (B) into two equal parts horizontally. **Back:** Divide the first square on upper right (B) into four equal parts vertically.	2.76	HE	2.82	HE	2.33	LE	2.85	HE	3.29	3.29
6.	**Front:** From A measure 3 down and to the right mark E and curve for neckline. **Back:** From A measure ½' down and 3' to the right mark E and curve for neckline.	2.76	HE	2.82	HE	2.22	LE	2.79	HE	2.71	2.71
7.	**Front:** Measure ½' down from B mark F. Measure out the shoulder from E towards F and connect with a line. **Back:** Measure ½' down from B mark F. Measure out the shoulder from E towards F and connect with a line.	3.00	HE	3.00	HE	2.39	LE	3.00	HE	3.89	3.89
8.	**Front:** From the shoulder point, draw a curve line to G to form the armhole. Measure ½' from D downwards to obtain H. join G to H then to waist dart with slant line. **Back**: From the shoulder point, draw a curve line to G to form the armhole. Measure ½' from D downwards to obtain H. join G to H then to waist dart with slant line.	3.08	HE	3.10	HE	2.44	LE	3.00	HE	3.09	3.09
9.	**Front:** Form bust dart by measuring 3-4' from side B-D, draw inside a line. Mark out 1/2' dart width on both sides and join the lines by slanting.	3.51	HE	3.47	HE	2.21	LE	3.45	HE	2.60	2.60
10.	**Front** : Form waist dart by measuring 3-4' from centre. Draw 5-6' line upward. Measure ½' on both sides of the line and join the lines by slanting. **Back:** Form waist dart by measuring 3-4' from centre. Draw 5-6' line upward. Measure ½' on both sides of the line and join the lines by slanting.	3.38	HE	3.41	HE	3.44	LE	3.39	HE	3.11	3.11
11.	**Skirt (Front and Back)** Front: Draw a vertical line equals skirt length measurement and measure horizontally ¼ hip measurement plus 1' for dart. **Back**: Draw a vertical line equals skirt length measurement and measure horizontally ¼ hip measurement plus 1' for dart.	3.57	HE	3.53	HE	3.78	LE	3.58	HE	3.54	3.54

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Table 2 continued

	Pattern Drafting **Bodice Block (Front and Back)**	**N = 37** **FU**		**N = 17** **S U**		**N = 9** **Polytechnic**		**N = 33** **F C E**		**N = 35** **S C E**	
		$\bar{x}$	R	$\bar{x}$		$\bar{x}$	R	$\bar{x}$	R	$\bar{x}$	R
12.	**Font:** Complete the rectangle and mark ABCD. **Back:** Complete the rectangle and mark ABCD.	2.65	HE	2.71	HE	2.32	LE	2.73	HE	1.89	1.89
13.	**Front:** Measure hip depth from A and B 7-9', mark EF and rule across. Back: Measure hip depth from A and B 7-9', mark EF and rule across.	3.19	HE	3.12	HE	2.41	LE	3.12	HE	3.11	3.11
14.	**Front:** From line A-B measure ½' upward and mark G. Curve line from A to G for waist. **Back:** From line A-B measure ½' upward and mark G. Curve line from A to G for waist.	2.89	HE	2.88	HE	2.38	LE	2.91	HE	3.14	3.14
15.	**Front**: From A measure 3-4' for dart. Rule a line from waist down 5-6' before hipline. Connect. **Back:** From A measure 3-4' for dart. Rule a line from waist down 5-6' before hipline. Connect.	3.27	HE	3.29	HE	2.22	LE	3.27	HE	3.11	3.11
16.	**Front and Back**: Measure ½' on both sides of dart and connect by slanting. **Back:** Measure ½' on both sides of dart and connect by slanting.	2.86	HE	2.76	HE	2.33	LE	2.79	HE	3.54	3.54
17.	**Front**: Measure ½' at hem line for curve. and **Back:** Measure ½' at hem line for curve.	3.89	HE	3.88	HE	4.00	HE	3.88	HE	3.31	3.31
18.	**Front:** Measure ½' from hemline upward. Draw a curve from D-C for hem. **Back**: Measure ½' from hemline upward. Draw a curve from D-C for hem.	3.14	HE	3.06	HE	2.89	HE	3.09	HE	2.91	2.91
19.	**Sleeve Block** Draw a vertical line equals arm length measurement plus ½'. Measure across top arm measurement plus 2'.	2.57	HE	2.59	HE	2.56	HE	2.61	HE	3.37	3.37
20.	Complete the rectangle and mark ABCD.	3.03	HE	3.12	HE	3.33	HE	3.12	HE	3.43	3.43
21.	Divide the rectangle into four equal parts vertically.	3.49	HE	3.53	HE	3.89	HE	3.58	HE	3.11	3.11
22	Measure down from top line A down C 5' for depth of crown. Rule across and mark EF.	1.89	LE	1.88	LE	1.78	LE	1.82	LE	3.31	3.31
23.	Rule a line from E and F to line AB at the center and mark 1.	3.41	HE	3.35	HE	3.78	HE	2.45	LE	3.14	3.14
24.	Find centre vertically for smooth curve and join centre with curve ½' in and out on both sides for sleeve head.	2.76	HE	2.82	HE	3.00	HE	3.09	HE	3.00	3.00
25.	Join down with a slight curve from C-D for wrist line.	3.14	HE	2.47	HE	2.44	LE	1.67	LE	3.43	3.43
26.	Measure length to elbow measurement and mark GH.	2.43	LE	3.00	HE	2.33	LE	3.30	HE	3.14	3.14
	Grand Mean ($\bar{x}$)	3.02		3.02		3.01		2.98		3.13	3.13

Key: FU – Federal Universities, SU- State Universities, FCE- Federal Colleges of education, SCE- State Colleges of Education, R- Remark, HE- High Extent.

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Table3: Mean ($\bar{x}$) responses and standard deviation of technical skills required of lecturers of Home Economics to advance from manual to computer assisted teaching of pattern drafting for Entrepreneurship in Tertiary Institutions.

	Technical Skills	N = 37 Federal Universities			N = 17 State Universities			N = 9 Polytechnic			N = 33 Federal College of Education			N = 35 State College of Education		
27	Items	$\bar{x}$	SD	R	$\bar{x}$	SD	R	$\bar{x}$	SD	R	$\bar{x}$	SD	R	$\bar{x}$	SD	R
28	Ability to use software packages.	3.05	0.62	A	3.06	0.56	A	3.00	0.71	A	3.03	0.64	A	3.03	0.62	A
29	Ability to discuss pattern drafting software in CAD.	3.11	0.70	A	3.06	0.83	A	3.11	0.33	A	3.09	0.72	A	3.06	0.68	A
30	Skill for effective use, care of software packages.	3.54	0.51	A	3.35	0.49	A	3.67	0.50	A	3.61	0.50	A	3.54	0.51	A
31	Ability to discuss CAD language and materials.	3.51	0.51	A	3.65	0.49	A	3.44	0.53	A	3.36	0.49	A	3.49	0.51	A
32	Ability to discuss procedures of pattern drafting using software.	3.43	0.50	A	3.35	0.49	A	3.33	0.50	A	3.58	0.50	A	3.46	0.51	A
33	Describe stages in software design process.	3.62	0.49	A	3.82	0.39	A	3.00	0.00	A	3.55	0.51	A	3.63	0.49	A
34	Teach drafting basic blocks using CAD.	3.54	0.51	A	3.59	0.51	A	3.33	0.50	A	3.64	0.49	A	3.54	0.51	A
35	Practice selection of pattern pieces items (e.g. bodice, sleeve, skirt).	3.43	0.50	A	3.35	0.49	A	3.89	0.33	A	3.33	0.48	A	3.43	0.50	A
36	Ability to print.	3.11	0.31	A	3.12	0.33	A	3.11	0.33	A	3.15	0.36	A	3.11	0.32	A
37	Skill for effective applications programming interfaces (APIS) e.g. 2-D, 3- D.	3.51	0.61	A	3.65	0.61	A	3.00	0.00	A	3.58	0.56	A	3.51	0.61	A
38	Effective platform independent (can run in windows or other operating system).	3.27	0.45	A	3.29	0.47	A	3.67	0.50	A	3.24	0.44	A	3.26	0.44	A
39	Multi- device operation (can use mouse, keyboard or track ball to operate it).	3.46	0.51	A	3.59	0.51	A	3.11	0.33	A	3.55	0.51	A	3.49	0.51	A
40	Rendering (texture mapping).	3.59	0.50	A	3.59	0.51	A	3.00	0.00	A	3.61	0.50	A	3.60	0.50	A
41	Skill for transformation of 2D and 3D rotation, translation, scaling and perspectives.	2.70	0.85	A	3.47	0.87	A	3.22	0.44	A	2.36	0.96	DA	2.91	0.70	A
42	Procedures for color models.	2.95	0.85	A	3.06	0.90	A	2.44	0.53	DA	2.91	0.72	A	2.71	0.83	A
43	Skills for computer pattern markings e.g. lines, notches, grain, darts etc.	3.14	0.92	A	1.53	1.18	DA	3.78	0.67	A	2.24	1.12	DA	2.74	1.15	A
44	Ability to grade patterns.	3.08	0.64	A	3.24	0.44	A	3.11	0.60	A	3.09	0.68	A	3.09	0.56	A A
45	Software driver drafting techniques.	3.05	0.81	A	2.18	1.24	DA	1.00	0.00	DA	3.12	0.74	A	1.46	0.85	DA
46	Skills for measurements for the bodice, sleeve and skirt pattern drafting.	2.86	0.79	A	3.71	0.59	A	3.33	0.50	A	3.33	0.78	A	3.29	0.57	A
47	Software procedure for drafting block (bodice/ skirt/ sleeve).	3.11	0.74	A	3.59	0.51	A	3.33	0.50	A	3.33	0.69	A	3.26	0.66	A
48	Ability to use projector.	3.41	0.86	A	3.47	0.87	A	4.00	0.00	A	3.27	0.88	A	3.89	0.47	A
	Grand Mean ($\bar{x}$)	3.26			A			3.18			3.24			3.21		

Key: FU – Federal Universities, SU- State Universities, FCE- Federal Colleges of education, SCE- State Colleges of Education R- Remark, A- Agree, DA- Disagree.

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98 with mean ($\bar{x}$) score ranging from 2.71 – 3.89 and a grand mean ($\bar{x}$) of 3.21 as the technical skills required for lecturers of Home Economics to advance from manual to computer – assisted teaching of pattern drafting for entrepreneurship, while item 95 with a mean ($\bar{x}$) score of 1.46 which was below the cut-off thus the respondents disagreed that software driver drafting techniques is not technical skill required for lecturers of Home Economics to advance from manual to computer-assisted teaching of pattern drafting.

3.2 Hypotheses

H01: There will be no significant difference between the mean responses of Home Economics lecturers in Federal and State tertiary Institutions on the extent to which they are competent in teaching pattern drafting using manual method in tertiary institutions in Nigeria.

The result in table 4, showed the t-computed value of 0.626 and a p-value of 0.533. Testing the null hypothesis at an alpha level of 0.05, the p-value of 0.533 was greater than the alpha level of 0.05. Therefore, the null hypothesis was accepted. This implied that there was no significant difference between the mean () responses of Home Economics lecturers in Federal and State tertiary institutions in South East, Nigeria on the extent to which they are competent in pattern drafting using manual method.

H02: There will be no significant difference between the mean response of Home Economics lecturers in the Universities, Polytechnic and Colleges of Education as regards the technical skills required to advance from manual to computer assisted teaching of pattern drafting for entrepreneurship in tertiary institutions in Nigeria.

Table 5 showed the f-computed value of 50.546 and a p-value of 0.000. the results showed that in testing the null hypothesis at an alpha level of 0.05, the p-value of 0.000 was less than the alpha level of 0.05. Therefore the null hypothesis was rejected. This implied that there was significant difference between the mean () responses of Home Economics lecturers in the Universities, Polytechnic and Colleges of Education in South East, Nigeria. on the technical skills that would be required to advance from manual to computer-assisted teaching of pattern drafting for entrepreneurship.

4. Discussion

The findings of the study showed that there is high extent of competence among lecturers of Home Economics in teaching pattern drafting using manual method. The patterns include bodice blocks (front and back), skirt blocks (front and back) and sleeve block. There was no significant difference between the mean ($\bar{x}$) responses of Home Economics lecturers in the Federal and State tertiary institutions on the extent to which they were competent in teaching pattern drafting using manual method. This finding supports the studies of Utuk (1991)[27] who worked on the development and evaluation of three techniques for teaching basic pattern drafting in Senior Secondary Schools in Akwa Ibom State. The study found no significant difference in the mean ($\bar{x}$) performance of the three groups of students measured with a criterion referenced checklist. The study also is in line with the studies of Varney (1980),[28] which indicated that patterns are needed in dress making in order to obtain a better fit and to save material.

The study discovered that among other technical skills

Table 4: t-test analysis of the mean ($\bar{x}$) responses of Home Economics lecturers in Federal and State tertiary institutions in South East, Nigeria on the extent to which they are competent in pattern drafting using manual method.

Variables	N	Mean ($\bar{x}$)	SD	DF	t-cal	p-value (2-tailed)	Decision
Federal tertiary institutions	33	60.24	5.12	66	0.626	0.533	Accept
State tertiary institutions	35	59.49	4.84				

Table 5: One Way Analysis of Variance of the mean responses of Home Economics lecturers in the Universities, Polytechnic and Colleges of Education on the technical skills that would be required to advance from manual to computer assisted teaching of pattern drafting for entrepreneurship in tertiary institutions in South East, Nigeria.

Source of variation	Sum of Squares	DF	Mean($\bar{x}$) square	F-cal	P value	Decision
Between Groups	2628.707	2	1314.353	50.546	0.000	Reject
Within Groups	3328.423	128	26.003			
Total	5957.130	130				

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needed by the Home Economics lecturers to progress from manual to computer assisted teaching of pattern drafting for entrepreneurship were the ability to discuss pattern drafting software in CAD, effective use and maintenance of software packages, effective applications programming interfaces (2D, 3D) skills, color model and patterns grading abilities, and so on. According to Onah and Okoro (2010),[24] instructors at postsecondary educational institutions lack the necessary training, which prevents them from having the necessary abilities to impart effective understanding of ICT tools to their pupils. These results agree with Dimelu's (2010)[10] findings as well. In a research on the need for competency enhancement among home economics instructors in South East Nigerian colleges of education on the use of ICT for successful teaching, the author discovered that the teachers lacked proficiency with word processing, internet usage, and PowerPoint use. The mean ($\bar{x}$) replies of the home economics instructors at universities, polytechnics, and colleges of education differed significantly when it came to the technical abilities needed to go from teaching pattern drafting for entrepreneurship by hand to teaching it using computers. This might be attributed to variations in the curricula, the degree of facility accessibility, the training, and the motivation of the lecturers provided by the different schools.

5. Conclusion

Patterns are fundamental building blocks used in the creation of clothing. They are quite beneficial for extensive manufacturing. Pattern drawing instruction has transitioned from manual to computerized throughout time. This study provided empirical evidence that lecturers in clothing and textiles are capable of instructing students in pattern drawing utilizing the manual approach. The transition from manual to computer-assisted pattern drafting instruction shouldn't be too drastic; with time and computer education training, there will be significant progress. With that progress, students will graduate from college with the necessary skills for producing clothing in large quantities, which will strengthen their entrepreneurial spirit and promote both personal and societal development.

6. Recommendations

Based on the findings of the study, the following recommendations were made;

1. To improve Clothing and Textiles teachers' technical skills, University body –NUC, the Polytechnic body – NBTE, and the College of Education body-NCCE should conduct workshops and seminars on computer assisted pattern drafting training for them.

2. The Federal and State Ministries of Education should guarantee that appropriate financing is available for the provision of computer facilities and competent lectures training.

3. Tertiary institutions may be able to aid in the supply of ICT facilities in order to improve their student's education.

4. Lectures in Home Economics should be retrained in order to teach effectively. This would encourage students to master technical skills that will enable them to become entrepreneurs once they graduate.

Ethics and consent

Not applicable

Availability of data and material

All data generated or analyzed during the study are included in the published article (and its supplementary information files).

Conflict of interest

The author has no competing interest

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Author's contribution

Sole authorship

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