

# Fashion Design Training in Technical Universities and Performance of Graduates in Computer-Aided Apparel Development in Ghana

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**Abstract:** The purpose of this study was to determine the competency of Higher National Diploma (HND) fashion design graduates in computer-aided design (CAD) apparel development. It further sought to identify and document the CAD apparel development activities in the fashion industry and examine the availability of CAD apparel development resources in technical universities in Ghana. A cross-sectional survey design was employed to carry out this study. The target population for the study were HND graduates of the fashion design programme, managers of the fashion industry, and lecturers teaching apparel development and production. Snowball and purposive sampling techniques were employed to select the respondents for the study. The sample size for the study was 224 (that is, 4 managers in the fashion industry, 196 HND fashion graduates, and 24 Fashion lecturers). Data collection instruments employed were questionnaires, interview guide, observation, and test. The study revealed that resources for teaching and learning CAD apparel development were not available in most fashion design departments. The study also revealed that most graduates were incompetent in CAD applications for apparel development. The study recommended that stakeholders in charge of providing teaching and learning resources should build computer laboratories for fashion design departments and equip them with CAD applications that are relevant in the fashion industry. The study further recommended that fashion design departments in Technical Universities should liaise with industry to train lecturers in CAD apparel development and production.

**Keywords:** Computer-Aided Design, Apparel Development, Pattern Drafting, Pattern Grading and Marker

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## 1. Introduction

Computer-Aided Design (CAD) is a design system in which computer devices and software are used to plan, perfect, and evaluate an invention accurately before it is mass-produced [1]. The contemporary CAD software offers the opportunity to evade small operations and manual work, increase accuracy, and productivity, and organize information flow [2]. CAD is the usage of technology in the design process or the use of specific computer applications or software to come out with fascinating designs [3]. CAD is the incorporation of techniques of computer science for

production and technical design or modeling [4]. CAD technology is the third chapter of the manufacturing revolt era of mass and efficient production [5]. CAD is the integration of techniques of computer science of engineering and technical design or modeling. CAD entails the use of hardware and software to either create or modify or analyze or optimize a 2-dimensional (2D) or 3-dimensional (3D) product design or model in order to minimize labour, time, cost, and raw materials [6].

The usage of CAD systems is meant for the execution of

all processes and the amalgamation of every single process into one joint flow, for the organization of logistics and the mobility of work tasks [7]. Apparel development using a CAD system aims to curtail the utilisation of paper or paperboard in apparel development because, by means of a CAD system, the apparel turns into a digital archive [1]. CAD or CAD software is now one of the most vital tools in the fashion industry for pattern making, pattern grading, and marker creation [3]. The CAD usage in apparel development includes designing, pattern making, pattern grading, marker making, pattern layout, and fabric cutting to the development of prints among other production processes [8]. The use of CAD garment designing systems excludes the time-consuming manual preparation of patterns, construction of designs, and relocation of written information [6]. The fashion industry has benefited greatly from CAD leading to better efficiency in product designs, colour selections, and more importantly, memory storage for future use [9]. In the fashion industry, CAD plays a substantial role in apparel development since CAD is used in the fashion industry for mass customisation; advancing more design, frequent altering styles, and production, making work easier through effective and better-quality products [10]. CAD in fashion and textiles is very essential to the future of the industry, so a number of the textile and garment production houses in Ghana are investing in that regard. However, there is an apparent disconnection between training CAD in the universities and the world of work.

### 1.1. Statement of the Problem

Training in CAD applications at technical universities in Ghana seeks to equip learners with skills involved in the use of computers in apparel development. However, there have been complaints that HND fashion design graduates from technical universities in Ghana have no or inadequate skills to enable them to perform CAD apparel development activities in the fashion industry. In spite of these criticisms little research exists to support these criticisms. This study, therefore, sought to assess the competency of HND fashion design graduates in CAD apparel development.

### 1.2. Objectives

- i. To identify and document the CAD apparel development activities in the fashion industry in Ghana.
- ii. To examine the availability of CAD apparel development resources in technical universities in Ghana.
- iii. To assess the competency of HND fashion design graduates in CAD apparel development.

### 1.3. Research Questions

- i. What are the CAD apparel development activities in the fashion industry in Ghana?
- ii. Are there CAD apparel development resources in

Ghana technical universities?

- iii. How competent are HND fashion design graduates in CAD apparel development?

## 2. Materials and Methods

This study employed a cross-sectional descriptive survey to amass data. The cross-sectional descriptive survey was considered because it has the advantage of soliciting respondents' views on the nature of the situation as it existed at the time of a study [11]. A cross-sectional descriptive survey was used because it permitted the collection of both quantitative and qualitative data from the target population under study at the lowest cost [12]. A cross-sectional survey is a design in which the researcher amasses data on merely a trivial portion of the target population to get large information about the sampled components of the population as a whole [13].

HND graduates of the fashion design programme, managers of the fashion industry, and lecturers teaching apparel development and production were the target population for the study. The HND graduates were selected because they covered all the CAD courses and also underwent industrial attachment in the fashion industry. The managers of the fashion industry were involved in the study because they have in-depth knowledge of CAD activities in the industry. The lecturers were involved in the study because they were responsible for transferring CAD apparel development and production knowledge and skills to the fashion design learners.

Purposive sampling and snowball sampling techniques were employed in the selection of the participants of the study. There were many lecturers teaching the various courses of the fashion design programme in the technical universities. The purposive sampling technique was used to select only the pattern and garment technology lecturers and managers of the fashion industry. The snowball sampling was used to trace the HND fashion design graduates. The sample size for the study was 224 (managers 4, fashion graduates 196 & 24 lecturers).

The research instruments used for data collection were a questionnaire, interview guide, observation and test. A closed-ended questionnaire was used to collect data from the fashion design graduates and lecturers. The interview guide was used to amass data from the managers of the fashion industry, and some lecturers and graduates who filled in the questionnaire. The observation was used to ascertain the availability of CAD resources in the fashion design departments. A practical test was used to validate the competency of graduates' who claim they can use CAD for apparel development.

The data collected was analysed quantitatively and qualitatively to address the objectives. Statistical Package for Social Sciences (SPSS) version 21 was used to analyse the quantitative data obtained from a close-ended questionnaire. The qualitative data obtained were analysed manually under the various themes.

### 3. Findings and Discussions

#### 3.1. Findings

The findings in Figure 1 indicate that the majority (83.16%) of Fashion Design Departments in Ghana Technical Universities did not have computer-aided design apparel development resources to effectively equip learners. 16.84% agreed that they had CAD resources either at the Departmental or Faculty levels.

As indicated in Table 1, the majority of HND fashion design graduates 69.39% indicated that they were not taught CAD apparel development during their training at the technical university while 30.61% said they were taught. On the other hand, 79.6% of the graduates revealed that there were not taught CAD by apparel development and production lecturers while 20.4% said they were taught by lecturers handling apparel development and production. Finally, a higher number of the respondents, 91.8% disagreed that they had in-depth knowledge and skills in CAD apparel development whilst 8.2% agreed with the statement.

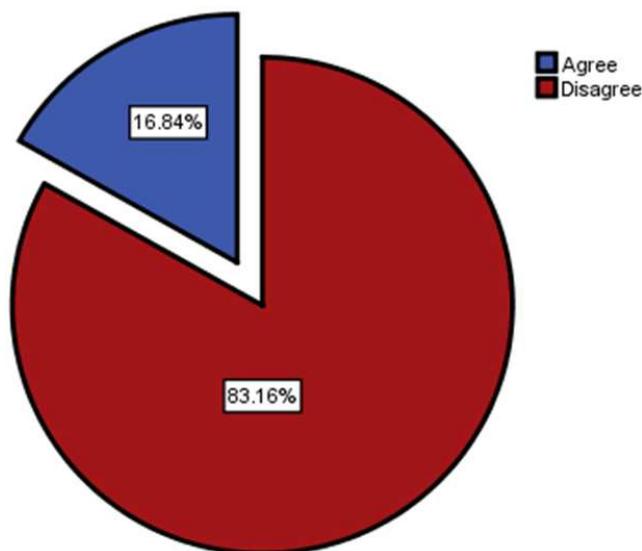


Figure 1. Availability of CAD resources in fashion departments.

Table 1. Competency of fashion design graduates.

Statement	Agree	None	Disagree
I was taught CAD apparel development during my training at the university.	30.6%	-	69.4%
My apparel development lecturers were the ones that taught me CAD apparel development.	20.4%	-	79.6%
I have in-depth knowledge and skills in CAD apparel development.	8.2%	-	91.8%

#### 3.2. Discussions

##### 3.2.1. CAD Apparel Development Activities in the Fashion Industry in Ghana

Gerber, Lecturer, and Richpeace were the software mostly used for apparel development in Ghana’s fashion industry. The CAD activities in the factory were apparel designing, pattern drafting, pattern grading, marker making and 3-D Trials/CAD sample. The discussion of the various CAD activities in the fashion industry is as follows:

##### (i). CAD Apparel Designing

The CAD apparel design in the fashion industry involves the use of computer applications to design garments and accessories. In Ghana’s fashion industry, CAD activities involve playing with shapes, figures, motifs, colour schemes and layouts to illustrate and create garments and accessories.

##### (ii). CAD Pattern Drafting

The CAD pattern-making activities in the industry involve using computer software to develop the basic component of the garments. There are two ways of CAD pattern drafting in the industry. These are the *first pattern and digitalisation*. The first pattern-making involves developing the basic component of the garment using computer software. Digitalisation is the process of scanning and feeding manually drafted patterns or patterns which are on paper into the memory of the computer using digitising boards, digit pens or dig mouse. These digitised patterns are then made

available for modifications. It was discovered from the interview conducted by the managers of the fashion industry that, digitalisation pattern making is normally adopted whenever the clients come up with their own patterns to be used to manufacture a garment for them.

##### (iii). CAD Pattern Grading/Shifting

Pattern grading is the practice of increasing or decreasing the size of a garment component to other sizes. In the fashion industry in Ghana, the patterns to be graded are inputted into the computer and the diverse sizes are created mechanically. The motive of grading patterns is to proportionately decrease or increase the size of a pattern, whilst maintaining the shape, fit, balance, and scale of the garment.

##### (iv). CAD Marker Making

A marker is a paper containing the garment components. It is what the fabric cutter uses when cutting cloths in mass production. In Ghana’s fashion industry, the CAD marker is done using the CorelDraw application. After digitally arranging the pattern pieces, they are printed out with a plotter on a long durable paper.

##### (v). CAD Pattern Cutting

After the pattern drafting or grading of the existing pattern, and marker making, the next CAD apparel development activity is cutting the drafted pattern. This process involves digitally feeding the patterns into a device called a plotter which does the cutting on durable paper in accordance with the measurement inputted.

### (vi). 3-D Trials/CAD Sample

At this stage, CAD is used to produce a computer-generated model which simulates the appearance of the garment. The model can be easily rotated to perceive the fit of the garment. This process helps to correct any defect in the pattern and the fit of the garment.

### 3.2.2. Availability of CAD Apparel Development Resources in Technical Universities in Ghana

The objective two of this study was to find out if there were resources available for the teaching and learning of CAD apparel development in fashion design departments in technical universities. The study revealed through observation that there were no computer laboratories available in most fashion design departments in technical universities. The study further revealed that computers and software such as Gerber, Lecturer and devices such as plotters which are used for CAD activities in the industry were not available for teaching and learning about CAD apparel development in the technical universities. It was found that there were few technical universities having computers and software for CAD apparel development, but those resources were not ones used in the fashion industry. For instance, some technical universities use adobe photoshop, illustrator and CorelDraw for teaching and learning about CAD apparel development. These findings were in agreement with the findings of [14] who opined that there were no adequate teaching and learning resources to handle apparel CAD technology training in Kenya institutions. The findings also were in support of [15] who stated that the inadequate availability of technology resources in schools leads to a low level of exposure to the use of technology resources for teaching and learning. Therefore, to encourage the use of technology facilities for teaching-learning activities, these facilities should be made available for both teachers and students to use.

### 3.2.3. Competency of HND Fashion Design Graduates in CAD Apparel Development

The third objective of the study was to assess the competency of fashion design graduates in CAD apparel development. The study revealed that the majority of the graduates were highly incompetent in CAD usage for apparel development. The Fashion Design Graduates revealed that most of the lecturers who taught them apparel development and production had no skills in CAD and so they only taught them the manual methods of apparel development. They further indicated that sometimes Graphic Design Lecturers were assigned to teach them; but unfortunately, such Lecturers lacked knowledge, skills and experiences in apparel development, and so they only taught them to develop textile motifs or general methods of operating CAD software instead of demonstrating to them how to use CAD for apparel development.

## 4. Conclusions and Recommendations

### 4.1. Conclusions

The main purpose of this study was to assess HND fashion

design graduates' competencies in using CAD for apparel development. Based on the findings of this study, it was concluded that Fashion Design Departments in Technical Universities in Ghana lack CAD resources. The study also concluded that most Fashion Design Graduates lacked skills in CAD apparel development and production activities undertaken in the fashion industry in Ghana.

### 4.2. Recommendations

- i. Stakeholders in charge of teaching and learning resources and infrastructures should ensure that well-equipped computer laboratories are built for fashion design departments in Ghana's technical universities, and equip them with CAD application software(s) used in the fashion industry.
- ii. Lecturers in fashion design departments in technical universities should liaise with modern garment manufacturing industries to train them in CAD apparel development and production.
- iii. Technical universities should give preference to and sponsor fashion design staff who are willing to further their education or enhance their skills in CAD.

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## References

- [1] Imayanti, H. S. (2018). The effectiveness of clothing pattern-making training with CAD-based system for fashion students. *Advances in Social Science, Education and Humanities Research*, 201, 311-316.
- [2] Dāboliņa, I. & Viļumsone, A. (2012). The role of the latest clothing CAD/CAM system applications in the educational process. *Textile and Clothing Technology*, 7, 63-68.
- [3] Mitreva, E., Taskov, N. & Metodieva, B. (2014) Basis for the design and implementation of the quality system in CAD - CAM textile production. *International Journal of Information, Business and Management*, 6 (4), 42-51.
- [4] Musa-Ibrahim, A. & Agu, M. N. (2021). An Assessment of the role of computer-aided design (CAD) in the fashion industry. *International Journal of Innovation Science and Research Technology*, 6 (3), 371-374.
- [5] Mao, A., Luo, J., Li, Y., Luo, X. & Wang, R. (2011). A multi-disciplinary strategy for computer-aided clothing thermal engineering design. *CAD Computer Aided Design* 43 (12), 1854-1869.
- [6] Omondi, E. O., Imo, B. E. & Otina, M. A. (2016). Importance of CAD/CAM training for fashion design students in Kenya. *Journal of Research & Method in Education*, 6 (2), 70-75.
- [7] Viļumsone, A. & Dāboliņa, I. (2012). *Applications of virtual reality 3rd chapter virtual garment creation*. In Tech.
- [8] Oppong, J., auntie, E. & Biney-Aidoo, V. (2014). Appraising the use of computer technology in garment production firms in Accra/Tema metropolis. *Arts and Design Studies*, 17, 25-33.
- [9] Gausa, S. (2020). *Computer-aided design and computer-aided manufacturing training, competency and usage in textile industries of northern Nigeria* (Ph.D. thesis). School of Creative Arts, Kenyatta University.

- [10] Tabraz, M. (2017). Importance of fashion cad (Computer-Aided Design) study for garment industry in Bangladesh. *International Journal of Scientific & Technology Research*, 6 (10), 26-28.
- [11] Bakker-Edoh, D., Cassia, J. K., Kereth, G. A., ego, E. B. & Mburugu, K. G. (2021). Apprentices' perception on apparel fit made with pattern drafting and free-hand cutting methods. *International Journal of Strategic Marketing Practice*, 1 (1), 1-11.
- [12] Freytag, P. V. & Young, L. (2018). In Collaborative Research Design. Springer.
- [13] Kassah, J. K., Bakker-Edo, D. & balmy E. K. (2021). Textile training component of fashion design and textiles programme in technical university and industrial work skills requirements in Ghana. *Arts and Design Studies*, 93, 17-20.
- [14] Kamau, V. W. (2012). *Assessment of the adoption of apparel computer-aided design technology training in selected public universities in Kenya* (Ph.D. thesis). School of Applied Human Sciences, Kenyatta University.
- [15] Apagu, V. V., & Wakili B. A. (2015). Availability and utilization of ICT facilities for teaching and learning of vocational and technical education in Yobe State Technical Colleges. *American Journal of Engineering Research*, 4 (2), 113-118.