UNIVERSITY OF EDUCATION, WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

ASSESSING THE IMPACT OF TECHNOLOGY ON THE CREATIVITY OF

FASHION DESIGN STUDENTS IN VOCATIONAL TRAINING INSTITUTES

IN THE VOLTA REGION OF GHANA

LILY DZIGBORDI FIAKPORNU

MAY, 2022

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A Dissertation in the Department of FASHION DESIGN and TEXTILES EDUCATION, Faculty of VOCATIONAL EDUCATION, submitted to the School of Graduate Studies and Research, University of Education, Winneba, in partial fulfilment of the requirements for the award of the Master of Technology Education (Fashion Design and Textiles) degree

MAY, 2022

DECLARATION

CANDIDATE'S DECLARATION

I, LILY DZIGBORDI FIAKPORNU, declare that, this dissertation with the exception of quotations and references contained in published works which have all been identified and acknowledged is entirely my own work and it has not been submitted either in part or whole for another degree elsewhere.

SIGNATURE………………………………….
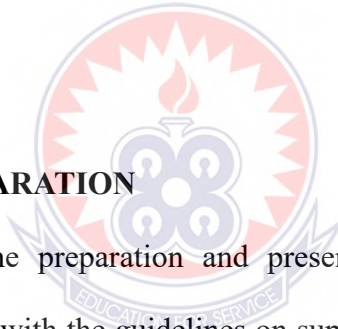
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SUPERVISORS DECLARATION

I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on supervision of dissertation laid down by the University of Education Winneba.

SUPPERVISOR‟S NAME: Ninette Afi Appiah (PhD)

SIGNATURE……………………………………………….

DATE……………………………………………………...

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This work has been a revealing journey to me. It was a journey that I could not travel alone to a safe destination. Upon sober reflection, I deem it fitting to acknowledge some key people who contributed significantly to help me reach this far.

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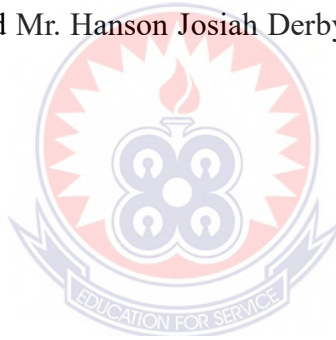
DEDICATION

I dedicate this work to my husband, Mr. Rene Tetteh and my children, Setraikor, Selikem and Setumte, my parents, Mr. Francis Kwasi Fiakpornu and Miss Blandina Favor Quashigah.
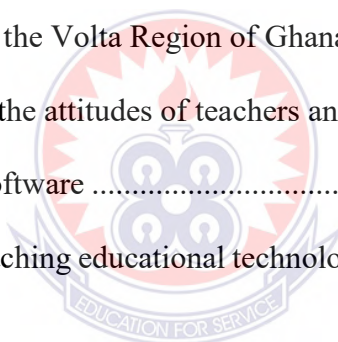
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ABSTRACT

The main purpose of the study was to assess the impact of technology on the creativity of fashion design trainees in Vocational Training Institutes in the Volta Region of Ghana. The study utilized explanatory research design. The population of the study included all fashion design trainees in Vocational Training Institutes in the Volta Region of Ghana. Census sampling technique was used to select all the 112 trainees for the study. A sample size of 112 trainees was used. Questionnaires were the main instrument used to gather primary data. The study revealed that educational technologists produce drawings and layouts used in catalogues, magazines, and other advertising media. The findings revealed that trainees are introduced to the use of Information and Communication Technology in their programme from the beginning of the study. The study recommended that the government through the Ghana Education Service should procure the necessary Information and Communication Technology infrastructure for the selected schools to enable the teachers and students benefit maximally in the ongoing technological development and Information and Communication Technology contribution in educational advancement.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Institutes of Vocational Training are being blamed for turning out designers who cannot sew. This is because designers are made to realize that the designs they come up with will be created by other people. As critical as the vision, the practical artistic art skills and technologies required to bring a garment together are just as critical (Anthony, 2014). Unfortunately, so many learners lacking these skills come from fashion design courses at Vocational Training Institutes. The consequence is that it would be very hard for young people to get work (Anthony, 2014).

In Ghana, a critical observation of vocational training education institutions reveals that, trainees in the various fashion departments are not able to relate practical meaning to theoretical lessons imparted in the classroom as there is no balance between academic education, creative practical skills and vocational applications (Laing, 2012). Technical skills are indispensable tools for development so any country that aspires to develop technologically must develop its technical and vocational education as a prerequisite for enhancing the skills of her citizens (Laing, 2012). Making reference to the rapid development of Korea, Singapore and the other industrialised Asian nations, Laing (2012) exhorts nations to adopt policies that are based on technical and vocational education to train a highly skilled workforce to support economic development.

Ghana has made much effort over the years to infuse the general school curriculum with vocation-oriented subjects that will equip the youth with entrepreneurial, productive and employable skills so they can function effectively in the global economy (Anthony, 2014). Ghana's strategy for nurturing vocational skills among the

citizens has focused on training students to become enterprising so they can adapt to the demands of a global knowledge-based economy that is driven by science and technology (Danso-Sintim, 2018).

Textiles, which is the focus of this dissertation, is an elective subject that is studied within the Visual Arts curriculum in Vocational Training Institutes and categorised as a two-dimensional (2-D) Visual Arts subject. Studied over the three-year Senior High School duration in tandem with one or two three-dimensional (3-D) subjects such as Sculpture or Ceramics, the Teaching Syllabus for Textiles (Ministry of Education, 2016), indicates that this elective subject was designed to equip trainees who study it with practical skills that will enable them to set up businesses and become self-employed in the field of textiles if they are not able to further their studies beyond SHS. However, some research findings have revealed that many Textiles trainees who graduate from the Vocational Training Institutes Visual Arts programme and are presumed to have acquired enough practical knowledge and technical skills in Textiles for self-employed or employment in this subject area are unable to do so (Danso-Sintim, 2018; Keteku, 2018; Boadi, 2012; Banson, 2010).

This points to two issues: either the teachers of Textiles are not teaching the subject well enough for the Textiles trainees to understand what they are taught or the trainees are not motivated enough or interested to learn what they are taught in Textiles, which reflects as failure to answer questions set by the West Africa Examinations Council (WAEC) in the final Textiles examinations.

Knowing that societies achieve significance through the production of visual arts, which includes Textiles, it is worthy to reiterate the opportunity that the Vocational Training Institutes Visual Arts curriculum provides for Textiles trainees to develop pride and patriotism through the study of modern and traditional textiles towards

imbibing some Ghanaian cultural and aesthetic values to promote the local textiles industry.

Information and Communication Technology offer special opportunities to stimulate growth and increase innovation in every local setting, thereby enabling individuals and institutions to interact more productively with the global economy and the wider world (Anthony, 2014). But to realize their potential, creative technologies must be part of a mix of productive changes and supporting capabilities. Resources must be matched by resourcefulness combined with other initiatives by local leaders, educators and entrepreneurs to achieve individual and institutional objectives.

1.2 Statement of the problem

Fashion design education at the second cycle level has challenges that must be addressed to sustain technical/vocational education and national creativity via the Visual Arts programme. As Boateng (2012) rightly pointed, disregard for vocational/technical education in Ghana shows through poor quality training facilities, inadequate number of institutions and training content. Personal experience as fashion design teachers and examiners in higher education attests to the waning interest in practical skills acquisition among many trainees, particularly with respect to developing competencies in idea development, manipulation of tools and materials to create textiles works as enshrined in the teaching syllabus for textiles. This situation hinges on the lack of the requisite studios, equipment and other relevant infrastructure and logistics for effective teaching, learning and development of technical and employable skills among the youth of Ghana.

Visual Arts, which provides career-oriented skill is the most inadequately resourced of the elective programmes offered in the Senior High Schools. The net result

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is lack of enthusiasm for textiles among visual arts trainees. JHS graduates are parading the streets of Accra and Kumasi selling dog chains, bread, handkerchiefs and fruits instead of engaging in visual arts related businesses or self-employment in the respective elective subject areas (Kokotah, 2018). This makes it reasonable for Quayson (2016) to say that the educational reforms that introduced vocational skills into Ghana˴s school curriculum seems to be compounding rather than solving Ghana˴s socio-economic problems.

Poor performance of trainees in fashion design at WASSCE also ends up diverting potential fashion design students into graphic design, picture making, ceramics and other elective visual arts disciplines. Having fewer students in textiles is therefore making it easy for many technical institutions to remove fashion design from their menu of visual arts elective subjects offered, thereby limiting the variety of creative and technical skills that Visual Arts could acquire from the programme. Invariably, more visual arts students are becoming disillusioned and less enthused to offer fashion design (Quayson, 2016). According to Awe (2018), it has been observed that effective management of Senior High Schools have been a matter of concern to many educationists.

The concern has been hinged on whether or not Information Communication and Technology (ICT) facilities are readily available in the second cycle institutions. Many second cycle schools in Ghana do not have adequate educational technology equipment to facilitate teaching and learning. A close look at selected Vocational Training Institutes in the Volta Region in teaching and learning fashion design reveals that, inadequate educational technologies, instructional materials, poor Wi-Fi access at the schools and lack of up to date ICT instructional materials could have serious consequences on the effective teaching and learning in the institution.

This scenario calls for a situational analysis to establish the state of fashion design education in Ghana, particularly at the second cycle level which lays the foundation for tertiary education. This study therefore would assess the impact of technology on creativity of fashion design trainees in Vocational Training Institutes in the Volta Region of Ghana in order to suggest interventions for mitigating the problems to ensure acquisition of technical, creative and employable skills by the youth of Ghana.

1.3 Purpose of the Study

The main purpose of the study was to assess the impact of technology on creativity of fashion design trainees in Vocational Training Institutes in the Volta Region of Ghana.

1.4 Objectives of the Study

The study is guided by the following research objectives:

1. To evaluate the effectiveness of educational technology on creative fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana.

2. To assess the level of availability of educational technology facilities in selected Vocational Training Institutes in the Volta Region of Ghana.

3. To investigate the challenges facing the effective use of educational technology in the teaching and learning of fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana.

1.5 Research Questions

1. What is the effectiveness of educational technology on creative fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana?

2.   What is the level of availability of educational technology facilities in selected Vocational Training Institutes in the Volta Region of Ghana?

3.   What are the challenges facing the effective use of educational technology in the teaching and learning of fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana?

1.6 Significance of the Study

This study would be of immense importance to a wide range of people like fashion tutors, fashion trainees, tailors and dressmakers" association, and the national board for small-scale industries.

To the fashion tutor, the outcome of this study would help them identify existing gaps in the impact of technology on creativity of fashion design trainees in Vocational Training Institutes so that, appropriate method of teaching these creative technological fashion designs to get expected result.

To the fashion trainees, the outcome would give them an opportunity to know the realities that exist in the field of fashion design with respect to the impact of technology on creativity of fashion design trainees in Vocational Training Institutes in the Volta Region of Ghana. This study would help them prepare adequately before they enter into the apparel industry.

To the fashion designers/dressmakers and tailors association, the outcome would help them to identify existing gaps with the application of the creative fashion design technology principles to achieve the desired effect. Finally, to the national board for small-scale industries, the study would help them in making decisions pertaining to garment designing when it comes to upgrading the skills of members in the apparel industry.

1.7 Limitations of the Study

During the research a lot of limitations were encountered in the collection of data. First, the study was limited to vocational training institutions in the Volta Region. The target population for the study was only trainees of vocational training institutions in the Volta Region. The respondents were reluctant to fill the questionnaire since most of them claimed that their responses may be published. This affected the validity of the findings.

1.8 Delimitation of the Study

This research would focus on evaluating the impact of technology on creativity of fashion design trainees in Vocational Training Institutes in the Volta Region of Ghana. This study would be geographically delimited in scope to selected Vocational Training Institutes in the Volta Region of Ghana. The study is conceptually delimited to evaluate the effectiveness of educational technology on creative fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana. Secondly, to assess the level of availability of educational technology facilities in selected Vocational Training Institutes in the Volta Region of Ghana and thirdly, to investigate the problems facing the effective use of technology in the teaching and learning of fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana.

1.9 Organization of the Chapters

This dissertation would consists of six Chapters, Chapter one would deal with the background to the study, the statement of the problem, purpose of the study, research questions and objectives of the study, significance and organization of the study.

In Chapter two the researcher would review related literature whiles chapter three would deal with the research methodology used in the study.

Chapter three would describe the research design, the population sample and sample procedures, data gathering instruments and data collection procedures of the study, methods of data analysis. Chapter four would describe the research findings. Chapter five would discuss the main findings. Chapter six would present the summary of the findings, conclusions and recommendations and suggestions for further research.

1.10 Definition of Terms

Dart: The take-up of excess fabric of a determined amount at the edge of the garment, and converging to a diminishing point.

Dart principles: This refers to the three patternmaking principles and techniques applied in garment designing.

Style: A particular design of apparel item defined by the distinct features that create its overall appearance.

Design: A specific or unique version of a style.

Dressmaker: An individual who makes women clothing and possess the qualities of a fashion designer, as well as a pattern maker.

CHAPTER TWO

LITERATURE REVIEW

2.1 Technology and Creativity Development in the Fashion Industry

The concept of technology and creativity development in the fashion industry began with the birth of the *Haute Couture*. Charles Frederic Worth and his contemporaries were the first entrepreneurs to create a label and sew that label inside the garments produced (Grumbach, et. al., 2017). This ingenious marketing tool created desire and demand for garments possessing that label, or brand, only. From that point forward the *designer label* has been a hallmark of quality and desire. The notoriety of a designer brand can entice the consumer to purchase more than apparel.

In the early part of the 20th Century, Jean Patou's insight guided his company to use its *Haute Couture* name to sell non-apparel luxury products. Patou collaborated with a perfume manufacturer to produce *Joie* which had the Jean Patou name on the label and was promoted as "The most expensive perfume in the world" (Etheringon-Smith, 2014, p.34). The luxury image surrounding the *Haute Couture* label of Jean Patou enabled the perfume to be sold at a high price.

Patou's pioneering business acumen established a foundation for one of the most lucrative segments of the luxury fashion industry today: licensing. The sense of the term licensing in this context relates to the exchange of money for the use of a designer or company's name, copy written logo or other visual image. In 1948, Prestige hosiery in France and Christian Dior entered into the first licensing agreement between a designer and an accessory manufacturer (Grumbach, et. al., 2017).

Christian Dior was not required to purchase inventory from Prestige hosiery; the exact details of the agreement are not accessible at this time, but in principle Dior

gave Prestige hosiery the right to use his logo and name while in return Prestige hosiery gave Dior a percentage of sales of the products bearing his name. In the mid-1960s the *Haute Couture* houses of Yves St. Laurent, Hubert de Givenchy, and Pierre Cardin were the first of the *Haute Couture* businesses to begin licensing their couture names to ready-to-wear (Grumbach, et. al., 2017).

These *Haute Couture* firms did not want to engage in the ready-to-wear business, but realized the earning potential of the ready-to-wear market and contracted with a separate company to design and manufacture ready-to-wear that was sold with the namesake label. Licensing agreements have taken various forms, allowing the designer to have varying degrees of product design control (Grumbach, et. al., 2017).

The most common contemporary product categories for which luxury-level companies enter into licensing agreements are perfume, handbags, sunglasses and shoes. However Bill Blass chocolates and Courrèges hubcaps have appeared on the market at different intervals. Licensing of a prestigious name, applied too liberally, can actually result in the name losing its status. Pierre Cardin, for example, was an extremely talented, visionary *Haute Couture* and ready-to-wear designer in the 1960s, but through extensive licensing his name had lost its value; one can find a 3-piece Pierre Cardin luggage set for $79; no longer a luxury item (Matlack & Sager, 2015). Licensing remains an important component of the luxury industry marketing mix, however (Kissi, 2017).

Estimated worldwide retail sales of licensed fashion products in 2007 was $39.8 Billion (Bowman, 2018). The accessory industry especially flourished under licensing agreements. In order to build a brand image strong enough to induce the customer to purchase a 5-ounce bottle of water for $80, luxury-level companies invest heavily in research, development and promotion of creative apparel. "*Haute Couture* has

become a valuable asset and, for the houses that have preserved it, a competitive advantage, a standard for all the products – ready-to-wear, accessories, and perfume, that carry the label" (Grumbach, et. al., 2017). This study focuses on that important component, exploring how the luxury-level creative design process is evolving in today's technologically-dominated environment (p.34).

2.1.1   Technological Revolution in the Fashion Industry

The pattern of millennium transitions, system revolutions, social transitions, and change that happened at the turn of the 20th century was revealed yet again at the of the 21st century. In the 1990s a technological revolution based around computers and the Internet began transforming business in general and the fashion industry in particular.

(a) **Internet**

The Internet is most widely used in urban areas of developed countries; however its availability is growing constantly across the globe, especially in developing countries (Kunz & Gardner, 2017). From 2000 to 2008, Internet use in Africa grew 1,031.2% in the Latin America/Caribbean area 66.9%, and in the Middle East 1,176.8% while in Europe growth of Internet use for the same period was 266% while in Oceania/Australia Internet use grew 165.1% and in the US only 129.6%. Internet use in Asia, where over half of the world population is located, grew 406.1% in that 8-year period (Walmsley, 2018).

New business types have emerged and flourished formed around Internet based transactions. Companies today must consider both the physical and the virtual environments. Multi-channel retailing now includes selling on the Internet. Terms like *click-and-mortar* have come into the vocabulary; this defines businesses having both

a physical building and a virtual presence on the World Wide Web. In December of 2008, retail giant Bloomingdales announced the elimination of its catalog division, shifting all of its "direct-to-consumer efforts to the Internet" (Gallagher, 2018). The consumer interface for many companies, however, exists exclusively through the World Wide Web. Companies can function from a garage or home office selling merchandise to thousands of customers around the world by developing and maintaining a *web page*, which is a visual representation of the company and its products that is accessed on the internet.

Computer technology facilitating the communication of information, or *information technology,* is integrated at every stage of the textile and apparel supply chain, from design, production, and distribution to marketing, sales, and the consumer (Kunz & Gardner, 2017). Adopting Internet-based PLM (Product Lifecycle Management) systems has become a key component to the financial success of an apparel business (Kusterbeck, 2018).

A relatively recent development, and a characteristic of the "Web 3.0" (Woods, 2018) generation of Internet evolution, is the virtual environment. This is a web space where avatars representing people and businesses function in a virtual world, exchanging actual money for goods and services. Second Life is the current leader in this area, with self-proclaimed 1,652,979 logins in a 60-day period, and $US 1,815,719 dollars spent in a 24-hour period (Kusterbeck, 2018).

In addition to these new business types, innovative forms of information dissemination have evolved. *Search engines* were developed to help the user find information about a particular subject amid the vast resources available on the Internet. *Google,* through its founders" technological and business prowess, has become the leading search engine; the common phrase *"I Googled it"* referring to the

fact that one put a term into Google‟s search engine to see the results shows how deeply the use of Google has penetrated society. E*newsletters*, news and information websites, and *e-zines* (Internet-based magazines) are also components of the new *Information Technology* environment based on the Internet (Kunz & Gardner, 2017).

The Internet is also changing the way people work together due to its easy access and the fact that individuals may choose to remain anonymous. This paradigm facilitated a democratic user-generated environment where anyone could contribute. Friedman (2016) defined the term *open sourcing* where Internet users can play a part in the development of ideas and products.

Netscape, the first Internet browsing software, was created by the founder giving open access to multiple contributors. Through an open, auto-monitoring process, best practices from a wide range of specialists created a product that changed the face of the World Wide Web (Friedman, 2016). The *open sourcing* concept has evolved into *crowd sourcing* (Newsweek, 2018). *Crowd sourcing*, or harnessing the knowledge of groups of people, has created innovations such as Wikipedia, the world‟s largest online source for definitions.

(b) *Wikipedia*

Initially, the validity of information on Wikipedia was questionable because it was a non-regulated process of information posting. The founders of Wikipedia, however, have developed a monitoring and validation process that has brought Wikipedia from a place to find anecdotal information to a serious resource for knowledge. Branching off of the Wikipedia success, individuals and businesses can now build a *wiki* around any topic and invite participants to work together in a virtual environment to solve a problem, create a document, share best practices, develop a concept or produce a resource for knowledge (Bell, 2019).

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The top five technologies created through *crowd sourcing* as of December 2008 are: Wikipedia, Facebook, Digg, Linux, and Yelp (Newsweek, December, 2018). Other outlets for individual expression on the Internet are *Blogs*, or Web logs, and *Podcasts. Blogs* are personal journals that individuals post on the Internet and become popular according to the number of people who find them and read them. *Podcasts* provide recorded audio clips that can be downloaded onto small playing devices and taken nearly anywhere. A podcast can be a type of audio journal, can provide entertainment, and also can be used for educational purposes.

A new concept, *social networking,* is developing rapidly on the Internet as well. *Myspace.com* and *Facebook.com* are websites with a system whereby individuals create an online presence and develop community ties in a completely virtual environment, sharing blogs, videos and photos. *Linkedin.com* provides a similar format for professional networking. *Youtube.com* facilitates sharing of videos among individuals and businesses around the world.

(c) *Social networking*

The influence of these new technologies on fashion is undeniable. Ann Watson, Vice president and fashion director of Henri Bendel, a New York Department store emphasized the natural cohesion of social networking and fashion: *"MySpace is a platform for self-expression, personal broadcasting, human contact, discovery of culture, and is a creative hub of readily accessible ideas ... So when we talk about how fashion is all about the individual style it is the influence of pop culture promoting the individual through self-expression platforms like MySpace"* (Feitelberg, 2018 p.65).

Capitalizing on the social networking phenomenon in-house, retailer Wet Seal created a proprietary social networking community that targets teens in April of 2008. By

August the company stated that "1.2 million outfits have been created, and the site has generated a 10 percent increase in revenue" (Corcoran, 2018). A unique approach to meshing the capacities of the Internet with fashion lies in the latest development by Tommy Hilfiger: Tommy TV. This Internet-only music video station targets the 18-24 year-old consumer (Jones, 2018).

While the site is intended to be a "marketing initiative" (Jones, 2018) and does not directly promote products, the home page does provide a link to the Tommy Hilfiger e-commerce site. These examples are only a sampling of the ways the Internet is reshaping communication and business in today's world, and new phenomena are developing so quickly that at any given time an attempt to give the "latest development" would be out of date. This study addressed the influence of some of these communication technologies on the creative fashion design process (Jones, 2018).

Designers of today function in an environment that is characterized by increased competition, enhanced consumer awareness, and rapidly-developing technology. In order to adapt to and thrive in this changing environment, it is essential to understand how these changes influence the creative process. This study contributed to a better understanding of the creative process in today's luxury industry and the effect of technology, specifically Internet technology, on creativity (Grumbach, et. al., 2017).

2.2 Global Competitive Fashion Environment

As mentioned previously, competition has always been an important component of the *Fashion Industry.* In the global economy of today, however, due to the combination of immediate and rapid dissemination of information about fashion trends, the lack of copyright protection, and the ability of the industry to quickly

respond to change, it has been extremely difficult to always create full financial benefit from creative fashion design ideas (Ellis, 2018).

For example, companies that are global fashion leaders, such as Prada from Italy saw the spring designs they revealed on the runway in October in Milan appear in lower priced retail stores such as H&M (Murphy, 2018) in January, before having presented the styles on the Prada retail selling floor at the planned delivery date of March. Another leader in the area of quick turnover of apparel production is Zara, a company based in Spain that has been producing fashion-forward clothing with a 30-day concept to consumer cycle for several years. The Zara state-of-the-art facility near Barcelona is a benchmark for companies looking to shorten the production cycle (Ellis, 2018).

These companies function due to a combination of the manner in which technology facilitates the proliferation of fashion trend information and the lack of legal repercussions for copying fashion designs. Such overt, rapid copying of fashion designs poses a multitude of problems for the fashion leaders, not the least of which is the inability to amortize investment in research and development (Ellis, 2018)..

The lack of copyright protection in the United States for creative fashion designs is especially delicate given the fact that every other developed country provides some type of protection for creative fashion designs. Representatives from the Council of Fashion Designers of America, the French Chambre Syndicale de la Couture et du Prêt a Porter, and the Italian Fashion Industry Association went to Washington D.C. in 2005 (personal communication with Dider Grumbach, June 21, 2016) to lobby with representatives of Congress and succeeded in finding a senator, Congressman Bob Goodlatte who has sponsored H.R. 5055, the Design Piracy Prohibition Act that will put copyright restrictions on fashion designs in the US. Copyright protection is not

embraced by all members of the US *Fashion Industry*, however. Trend forecaster and analyst David Wolfe stated that:

The [fashion] industry thrives „because of, and not in spite of, a lack of copyright protection"... because of the give-and-take among designers, Mr. Wolfe said it would be difficult to distinguish between a design that is copied and a design that is a product of inspiration (Palank, 2016 p.22).

In general, the Council of Fashion Designers of America has lobbied for passage of this bill, while the American Apparel and Footwear Association has been opposed. Negotiations between the two powerful American Fashion Industry trade associations resulted in the AAFA's rejection of the CFDA's proposal (Ellis, 2018). Combining the nebulous nature of defining what constitutes truly original designs, the potential legal disputes, trade interruption, and the packed Congressional schedule, it is unlikely that this bill will pass the US Congress in the near future. (Ellis, 2018).

Balmer, (2018) disputes any increase in creativity due to copyright protection, citing examples in creative design areas outside of fashion. The relevance of copyright protection to this study lies in the influence of the phenomenon on the creative process.

2.2.1 Technology as a Threat

In this technological revolution where computers are replacing many of a designers manual tasks current fashion designers find a similar situation as artists did at the beginning of the industrial revolution: Art was embattled. „From today painting is dead" was one response to the daguerreotype, forerunner of the photograph. The appearance of mass-produced artifacts opened a gap between art, including craftsmanship, on one side and machine-made imitations on the other – the unique

and the kitsch, high art and the popular. The artist found himself both more important and more threatened (Wilson, 2013).

Does the fashion designer find him or herself more important and more threatened than ever before? Not only are the producers of apparel learning of fashion trends faster than ever before due to the Internet phenomenon, but consumers are doing so as well (Palank, 2016). Increased consumer awareness of global fashion trends most certainly affects a designer's work, for the fashion process is built around mystery and surprise; maintaining those two elements in this new paradigm is quite challenging, yet essential to selling success. This study explored the fashion designer's perception of the influence of the Internet on the designer's role in the creative process.

2.2.2 Process Technology and Information Technology

Technology has aided designers and manufacturers to meet the current business environment's challenges. Because technology is a broad term and in order to clarify the discussion of this phenomenon, types of technology were divided into two categories: *Process technology* and *information technology*.

Process Technology is hardware and/or software that facilitate the actual physical development of the product. This category can be further sub-divided into computer aided design, computer aided pattern making, computer aided manufacturing and 3-D Body scanning/mass customization. Computer aided design encompasses programs that facilitate creative sketching, presentation boards, technical design, and textile design. Software programs used for these purposes include Adobe Photoshop and Illustrator, Point-Caree, In-Design, and Lectra Kaliedo (Wilson, 2013).

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Computer Aided Patternmaking includes digitizing existing patterns for grading and pre-production preparation, creating patterns from existing slopers, digitizing draped muslins for completion on the computer, and customizing patterns for made-to-measure clients. Taking the process another step further, technological development has led to 3-D virtual assembly of the pattern then evaluating the pattern on a virtual model complete with animation to see the virtual model walk, thus enabling changing of colour, pattern, proportion and details of the design before realizing it in actual fabric (Wolfe, 2018).

Computer aided manufacturing includes cutting a large quantity of garments in a paperless environment, using automated spreading and cutting, and for a few segments of the industry going all the way to automated assembly. Computer-aided manufacturing also includes supply-chain technology such as software for Product Data Management and Product Lifecycle Management, both in local networks and on the Internet (Wolfe, 2018).

Information Technology refers to the many methods that one can communicate ideas, words, and images both locally and over the World Wide Web. For the purpose of this study, it includes all of the previously-mentioned Internet-based information dissemination methods: e-zines, podcasts, myspace.com, youtube.com, secondlife.com, and blogs (both by industry professionals and by consumers). In addition, *Information Technology* includes web-based trend forecasting agencies; both subscription-based such as wgsn.com, and those with free access, competitor's websites as well as a myriad of options with public access such as style.com, elle.com, infomat.com, and cottoninc.com. (Wilson, 2013) This study has focused on the *Information Technology* component of the technology paradigm because it is an area that has received little attention in the literature.

This review of the context in which today's *Fashion Industry* functions is by no means comprehensive. The select components included here are intended to ground this study in the historical foundation and to examine its evolution in order to better explore the contemporary environment in order to effectively project future changes (Wolfe, 2018).

2.3 Creative Fashion Illustration and Fashion Design Technology

Fashion design and fashion illustration has been used interchangeably as a working definition for this project. In general, fashion illustration professionals work very closely with fashion designers to produce artistic, unique and creative visual images with the aid of traditional and digital media. Actually, fashion illustrators are basically tasked to develop eye-catching drawings aimed to boost the interest of the buying public to a particular clothing trend (Palank, 2016).

The images created by fashion illustration professionals are commonly integrated in print ads, television commercials, and online advertisements. Although, fashion illustrators are mainly tasked to make sketches, layouts, or images, they are still expected to fulfill other duties which may include creation of designs for garments, shoes, fashion accessories, and other apparels with the use of imaging software programs like Photoshop, Illustrator and others (International Academy of Design and Technology, 2011).

In connection with the above idea, some basic functions of fashion illustration can be addressed in the following:

- Create designs for garments, shoes, fashion accessories, and other apparels.

Bring the vision of the fashion designs to life through the illustration of the actual design plan.

- Sketch drawings using various mediums including paint, charcoals, coloured pencils, and computer software programs.

- Produce drawings and layouts that will be used in catalogues, magazines, brochures, flyers, commercials and other advertising media.

- Communicate fashion ideas through sketches, layouts, drafts and drawings

- Select the appropriate colour, sound, and animation that will go well with the fashion concept developed.

- Develop fabric patterns and designs that will be used for manufacturing garments and wardrobes.

- Maintaining open communication with the fashion designers, art directors, and buyers (International Academy of Design and Technology, 2011).

Drudi, (2018) believes that fashion illustration and technical drawings are used to visualize new clothing designs. It is of the utmost importance that these illustrations be clear, easy to understand, and accurately represent the aims of the designer. Therefore it is expedient to visualize texture, colour and feel in both fashion illustration and technical drawing.

In connection with this statement, Drudi, (2018) undertook a project in a published book where she used already made fabrics like denim, corduroy, and others, to illustrate different garment designs with both manual and digital techniques. She also suggests that the same item of clothing can be changed with insertion of different fabric design and this will enable a designer to quickly experiment with the fabric swatches and also to visualize the end product (Drudi, 2018).

2.4 Computer Aided Design (CAD)

The computer is one of the most powerful creative tools an artist can possess, and it is well on its way to revolutionizing the making of visual art just as word processors have transformed the way most people write. The Oxford Dictionary (2000) defines Computer Aided Design as the use of computers to design machines, buildings, vehicles and so on. Wolfe (2018) also defines CAD as a computer system used for designing textiles, apparel and other products.

The two definitions look somewhat different in the way they are presented but in principle they are similar in meaning. Computer Aided Design is a system used in the designing field of study and it gives the opportunity to every branch of the design field to define the term CAD in context of their study. Almost all definitions of CAD trace its root from a particular branch of the designing field of interest (Wolfe, 2018). For example, Wolfe defines CAD as a computer system used for designing textiles, apparel and other products from fashion background.

In practice, Computer Aided Design could be defined as the use of computer technology to assist the design process. Specialized CAD programmes exist for various types of design: architectural, engineering, electronics, civil, and woven fabrics to name a few. However, there are many acronyms associated with the CAD system that tend to define the right type of system in context. Examples of such acronyms are listed below: (Wolfe, 2018)

CAD - Computer Aided Design

CADD - Computer Aided Design and Drafting

CAM - Computer Aided Manufacturing

CIM - Computer- integrated Manufacturing

CAD software provide the user with input-tools for the purpose of streamlining design processes; drafting, documentation and manufacturing processes. CAD output is often in the form of electronic files for print or machining operations. CAD software use either vector based graphics to depict the objects of traditional drafting or may also produce raster graphics showing the overall appearance of designed objects (Eshun, 2015).

Schoeser (2015 p. 7) describes the move towards the use of computer technology in every aspect of the fashion and textile production pipeline as the „third industrial revolution". The first industrial revolution resulted in the process of mass production. The second industrial revolution brought about higher standards in products, increased speed of production and greater conformity of product specifications. In the third industrial revolution the use of CAD/CAM is resulting in greater manufacturing flexibility. This idea justifies that CAD is an essential tool for the modern fashion designer (Wolfe, 2018).

Sayem et al. (2019) opine that today‟s clothing industry comparatively prefers to use computer-aided design (CAD) techniques for both fashion design and pattern creation as it offers greater efficiency and time-saving solutions to many complicated tasks as well as facilitating Internet-based communication amongst designers, manufactures and retailers. This suggests that Computer Aided Design has become part of the designing instrument of today because of the benefits that can be derived from the system.

Traditionally, designers have made sketches of ideas with traditional tools and some designers still work in these ways. However, the methods are very slow for high volume production (Wolfe, 2018). The writer believes that CAD terminals can include sketch pads with electronic pens for drawing images into the computer. Previous

drawings or actual fabric patterns can be scanned into the system with equipment that can read an image on paper and put it into the computer. All works can be saved and retrieved on command for updating. Seasonal colour palettes can be incorporated, with hundreds of thousands of colour options (including tints and shades).

Aboagye (2019), made a similar statement and he holds the view that using repeat generating programmes such as Style Manager by Animated Images (Lectra), an image may be scanned in and the designer may randomly select a small area to be repeated. With a few clicks of the mouse a fabric swatch is available for approval or dismissal. Instantaneous colour changes can also be made. This technique offers the designer a trial and error method that was previously, time consuming. He believes that this is one of the biggest benefits of CAD.

2.4.1 Arguments against Overreliance on Computer

Alberta (2010), argues that while the benefits of CAD seem endless, there are some downsides as well. Before a business can purchase a system, time must be invested researching the large variety of software options currently on the market. Often, new hardware must be purchased to support the software (Alberta, 2010).. Once a company matches its needs with specific software, it has to plan ahead for training and support. Training, in some cases, accompanies the software purchase. In other cases training must be sought and can be time consuming and expensive. Training is also available in large cities by way of travelling seminars, acquired through college courses or offered by the individual software company (Alberta, 2010).

Although, the above statement is true, considering the operational processes of the garment manufacturing companies, the fact still remains that the advantages of the CAD system out-weighs the disadvantages and challenges of traditional methods.

Thornton, (2016), made some comments on the low level of creativity in publications by design professionals and blames all that is happening on the advent of computers. According to him, untrained individuals have access to inexpensive tools that can be used for a variety of publications.

New software have templates that facilitate the creation of newsletters, logos, announcements, letterheads, business cards, and home pages on the World Wide Web. With this comment he believes that the advent of computer is a threat to the graphic design profession. Markwei, (2019) agrees with Thornton (2016) and stated that the untrained artists have access to the computer software which makes designing easier and faster. Nevertheless, many people think they can do design without any formal training. It is obvious that, when graphic design started and it was all about drawing and painting of the advertisement, it was left for the professional artists.

The researcher believes that it is very important to have basic skills in formal and informal training for all designing sectors. However, the advent of computers has contributed rather positively to the design industry than its minor disadvantages.

2.4.2 Computer Software

According to Wilson (2013), a computer program or software is a sequence of instructions written to perform a specified task with a computer. A computer requires programs to function, typically executing the program's instructions in a central processor. The program has an executable form that the computer can use directly to execute the instructions.

Similarly, Stair (2013) also defined Computer Software as the stored machine readable code that instructs a computer to carry out specific tasks. Computer source code is often written by computer programmers. Source code is written in a

programming language that usually follows one of two main paradigms: imperative or declarative programming. Source code may be converted into an executable file (sometimes called an executable program or a binary) by a compiler and later executed by a central processing unit.

Alternatively, computer programs may be executed with the aid of an interpreter, or may be embedded directly into hardware. There are two important functional lines of the computer systems: System Software and Application Software. According to Wilson (2013) Systems software consists of low-level programs that interact with the computer at a very basic level. This includes operating systems, compilers, and utilities for managing computer resources.

In contrast, applications software includes database programs, word processors, and spreadsheets. Figuratively speaking, applications software sits on top of systems software because it is unable to run without the operating system and system utilities. This implies that applications like Microsoft Word, CorelDraw, Photoshop and others could not function without the operating system.

2.4.3 Popular Illustration and Designing Software

Eshun, (2015) states that Corel Draw is a vector-based drawing programme which has grown to become one of the leading drawing programme available on the PC. It's users range from amateurs to professional designers, who use the programme for projects which include simple logos to intricate technical illustrations. He also believes that it has been the obvious choice for many for different reasons.

2.4.4 Fashion Design Software

The fashion industry has come a long way, as stated earlier, and has grown into one of the largest industries in the world. In view of this, the use of technology in this field has increased. Fashion designing software are increasingly being used by fashion designers. According to Wolfe (2018) Fashion design software greatly aid the work of a fashion designer and help in more effective performance. They help in saving a lot of time, money and energy. These software packages help the designer in experimenting with a number of textures, colours and patterns for producing the perfect designs. They provide a variety of sketch backgrounds, tools for designing and repeating patterns and texture mapping (Wolfe, 2018).

There are various fashion design software packages available in the market today, such as Adobe Photoshop, Adobe Illustrator, CorelDraw, Digital Fashion Pro among others. Fashion designers have often been observed to use particular software according to their own individual requirements (Wolfe, 2018). They aid the designer right from the stage of designing to the production of apparel. The process of creating an illustration, design or a pattern as well as cutting has become easier with the help of software. Designs and illustrations can be made faster and more accurately (Wolfe, 2018).

Some have a number of basic designs incorporated in the software, which the designer can make use of. The designers can make modifications in the basic designs and personalize them. Even 2D and 3D formats of a design can be created. These designs can be printed or sent to other sections through e-mail on soft copies.

2.4.5 Digital Illustration

Computer illustration or digital illustration is the use of digital tools to produce images under the direct manipulation of the artist, usually through a pointing device such as a tablet or a mouse. It is distinguished from computer-generated art, which is produced by a computer using mathematical models created by the artist. It is also distinct from digital manipulation of photographs, in that it is an original construction "from scratch". Photographic elements may be incorporated into such works, but they are not the primary basis or source for them (Wilson, 2013).

The general term usually used for drawing, illustrations, photo management and design to communicate, educate or advertise through computer is known as computer Graphics. During a typical day, a lot of the images that we see around us are created on a computer. In the daily newspaper and popular magazines, many graphics are either created or retouched by draw or photo-manipulation programs. Graphic artists using common 3-D modelling programs produce the titles of many popular television shows and other events (Wilson, 2013).

Eshun and Appiah, (2014), believe that although graphics software was a relative latecomer to the computer world, it has advanced a long way in a short time. In the early 1980s, most graphics programs were limited to drawing simple geometric shapes, usually in black and white. Today, graphics software offers advanced drawing and painting tools, and virtually unlimited colour control. In newspapers and magazines, on posters and billboards, in TV and the movies, you see the products of these powerful tools.

2.4.6 Digital Graphics Image Display

The two main types of computer graphics are vector graphics and bitmaps (or raster). They fall into two primary categories; those that work with bitmaps are called paint programs and those that work with vectors are called draw programs. Each category has advantages and drawbacks, depending on the kind of output needed. All CAD systems are referred to as raster based or vector based. Vector graphics are made of lines and curves, and they are generated from mathematical descriptions that determine the position, length, and direction in which lines are drawn (Eshun, 2015).

Bitmaps, also known as raster images, are composed of tiny squares called pixels; each pixel is mapped to a location in an image and has numerical colour values (Eshun, 2015). Aldrich, (2014) also believes that images can be displayed on screen in two fundamental ways: a raster or vector display. From a design viewpoint it is important to understand the differences, and the benefits and restrictions of each, in other to avoid confusion and frustration in the computer system, especially, when creative results are required (Aldrich, 2014).

According to Appiah and Eshun, (2015) Vector graphics are ideal for logos and illustrations because they are resolution independent and can be scaled to any size, or printed and displayed at any resolution, without losing detail and quality. In addition, one can produce sharp and crisp outlines with vector graphics. On the other hand, bitmaps are excellent for photographs and digital paintings because they reproduce color gradations well. Bitmaps are resolution-dependent - that is, they represent a fixed number of pixels. While they look good at their actual size, they can appear jagged or lose image quality when scaled, or when displayed or printed at a resolution higher than their original resolution.

2.5 Availability of Technology for Creativity in the Ghanaian Context

Traditional methods of production and training are used by the majority of fashion/garment manufacturing industries. Ghana may not have enough qualified experts to assist the development and implementation of technology for creativity initiatives in the country right now. Pattern Technology, Fashion Drawing and Illustration, and Garment Technology have a small number of professors that specialize in these subjects. As a result, tutoring in such courses will be ineffective (Sarpong et al., 2012). As a result, graduates may be unable to meet current industrial expectations, prompting industries to retrain individuals to meet their needs. According to the findings of a study by Sarpong et al., (2012), a more inclusive approach to pedagogy where students are engaged in debates and practical lessons is more effective due to the practical nature of fashion related courses. The hands-on training will provide students with the technical skills they will need in their future careers. Government involvement at various educational levels, such as upgrading curricula to make them more modern and practical, will also represent a turning point in the fashion industry's fortunes. Lack of cash, knowledge, and critical skills, as well as poor and unpredictable revenue, are among the hurdles that impede some fashion players from incorporating technology into their creativities, according to Sarpong and Howard (2011).

Furthermore, most fashion training institutions appear to be lacking in modern production machinery and procedures. The majority of the tools and equipment used by garment and textile manufacturers are obsolete. This has an impact on the manufacturing process and the utilization of resources. Yaw (2013) went on to say that fashion designers who keep to old means of sketching their ideas are burdened with a lot of effort. Yaw (2013) went on to say that new technology software should

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be included into the fashion sector to help it function more efficiently. Client taste and preferences, supplier information, fashion trends, orders from customers, current prices, comments, criticisms, and recommendations can all be gained through the usage of social media and other platforms. Fashion designers often use social media to sell their designs as well as to gather information for new designs (Owusu-Bempah, 2016). MKOGH, Woodin, PKOG, and Elikem Kumordji are some of Ghana's most well-known fashion designers (Owusu-Bempah, 2016).

Fashion designers in Ghana, according to Owusu-Bempah (2016), use a variety of social media platforms such as Facebook, YouTube, Pinterest, Twitter, Google Plus, and Instagram to some extent. He went on to say that these apps were used on a daily basis to gather information, check out new trends and designs, and communicate with a diverse group of people, including clients, suppliers, and other fashion designers (Owusu-Bempah, 2016).

In poorer countries, however, this situation is less prevalent. In poor countries like Ghana, the full potential of social media in daily commercial activity is not fully realized (Owusu-Bempah, 2016). On a worldwide scale, leading fashion labels such as Gucci have integrated social media into their commercial activities (rather than relying solely on their website), and they often advertise their wares on platforms such as Facebook and Twitter (Kim &Ko, 2012). According to statistics published in the Ghana Business Directory, there are 127 fashion enterprises in Ghana, according to Owusu-Bempah (2016). A significant number of them (87, or 68.5 percent) do not use social media in their commercial activities. In sharp contrast, 40 businesses (or roughly 31.5 percent) used social media in their business activities (Owusu-Bempah, 2016). However, the number of Ghanaian fashion enterprises using social media is gradually increasing (Asiedu, 2017).

The impact of technology on the fashion industry can be seen in the advent of computer-aided design applications that are crucial in the design process (Yaw, 2013). Several companies in the worldwide fashion business are adopting the use of computer software for designing as a result of the benefits that may be achieved from embracing the usage of digital designs. The usage of software that aids in design in the fashion sector has been underutilized in Ghana (Yaw, 2013). This is due to the fact that some fashion students and teachers are perplexed by CAD systems and, as a result, are dissatisfied with the technology (Yaw, 2013). Yaw (2013) recommended that colleges pay close attention to the implementation and usage of computer-aided tools in fashion design courses as a teaching tool. Furthermore, the study suggested that fashion industry players make a concerted effort to organize periodic seminars and workshops to familiarize members with new software packages, as well as competitions involving their use (Yaw, 2013).

2.6 Empirical Review

A number of researchers (Sarpong, Howard & Osei-Ntiri, 2011; Foster & Ampong, 2012; Biney-Aidoo et. al., 2013) conducted researches in the field of small-scale garment industries focusing on challenges, cutting/sewing skills and training forms, with very little done on garment producers" knowledge, based on details associated with constructional processes.

The present nature of fashion calls for dressmakers to move along with the trend of producing innovative and creative garments that are well fitting and also appealing to their customers fashion sense. Armstrong (2010) asserted that, for garment producers to achieve success in garment designing, they must have in-depth knowledge about design analyses, figure analyses, taking accurate body measurement, and know how to apply the dart principles even in freehand cutting, in creating and

cutting unique styles. All these elements come to play when a dressmaker wants to construct a garment that is unique and well fitting.

Presently, styles are getting more complicated with each passing day; from Kente cloth sewn into wedding gowns to African wax print cloths that are used to make everything for all walks of life, dressmakers have to be very knowledgeable about the fundamental elements that influence the dynamism of fashion. The Ghanaian dressmaker can do more in garment designing, if attention is paid to darts and their principles that make clothing articles unique.

Although graphics software was a latecomer to the computer world, Eshun and Appiah (2014) believe it has come a long way in a short time. Most graphics applications in the early 1980s were confined to sketching simple geometric objects in black and white. Graphics software nowadays provides extensive sketching and painting abilities as well as practically limitless color management. The results of these strong instruments may be seen in newspapers and magazines, on posters and billboards, on TV and in movies.

Sayem et al. (2009) opine that today's clothing industry comparatively prefers to use computer-aided design (CAD) techniques for both fashion design and pattern creation as it offers greater efficiency and time-saving solutions to many complicated tasks as well as facilitating Internet-based communication amongst designers, manufactures and retailers. This suggests that Computer Aided Design has become part of the designing instrument of today because of the benefits that can be derived from the system.

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sketch pads with electronic pens for drawing images into the computer. Previous drawings or actual fabric patterns can be scanned into the system with equipment that can read an image on paper and put it into the computer. All works can be saved and retrieved on command for updating. Seasonal colour palettes can be incorporated, with hundreds of thousands of colour options (including tints and shades).

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According to him, untrained individuals have access to inexpensive tools that can be used for a variety of publications. New software have templates that facilitate the creation of newsletters, logos, announcements, letterheads, business cards, and home pages on the World Wide Web. With this comment he believes that the advent of computer is a threat to the graphic design profession.

Markwei, (2009) agrees with Thornton and stated that the untrained artists have access to the computer software which makes designing easier and faster. Nevertheless, many people think they can do design without any formal training. It is obvious that, when graphic design started and it was all about drawing and painting of the advertisement, it was left for the professional artists. The researcher, on his part, believes that it is very important to have basic skills in formal and informal training for all designing sectors. However, the advent of computers has contributed rather positively to the design industry than its minor disadvantages.

Sayem, Kennon and Clarke, (2009) organized a Skills Competition to promote and award students competence in the field of art. The selected areas were sewing skills, drawing skills and Computer design skills. Different objects and a human figure were composed for contestants of the drawing section to draw, illustrate and paint in any paint media. On the other side, contestants were given a poster project to execute with designing software of their choice. Among the programmes that were selected by the students were: CorelDraw, Adobe Photoshop, Adobe Illustrator and others.
The results provided gave some ideas of the capabilities of the various software. However, the poster project given to the contestants and the purpose for which the

competition was organized could not fully demonstrate the capabilities of the individual software, but, rather the competence of the individual contestants.

2.7 Theoretical Review

2.7.1. Behaviourism and Constructivism Theories

Mannerist and knowledge directions placed little emphasis on students" input and their contributions in the teaching and learning process. Accordingly, students could be deemed by these theories to be passive participants in the learning process (Woolfolk, 2016). In contrast to knowledge and mannerist theories which emphasised the important role played by the teacher and the organised transfer of content, the constructionist theory emphasised the students" central role in the learning process and acknowledged the students" ability to construct meaning through their learning (Kanuka & Anderson, 2019).

In the 20th and 21st centuries, many scholars attempted to define practical teaching and learning. These definitions became theories of teaching and learning, created to try and clarify the meaning of both. Learning theories provide us with conceptual frameworks of interpretation for the act of learning, and show us where to look for solutions to practical problems (Anthony, 2014). Teaching methods are in the main based on theories of learning. The most important learning theories are Behaviourism and Constructivism. These two approaches are based on two main schools of psychology that have influenced learning theory (Anthony, 2014).

They have different perspectives on learning, different perspectives on teaching styles, and different approaches to pedagogy and evaluation. Constructivist learning theory has been used to study the impact of ICT on teaching and learning. This

learning theory contributes to understanding both the construction of and relationship between curricula and events (Woolfolk, 2016"; Gredler, 2000).

It also provides direction for research and implementation. Because of the influence of the constructivist learning movement, the theory of constructive learning emphasises the teachers" central role in academic curricula and suggests improvement according to the teachers" needs and interests (Gredler, 2010; Woolfolk, 2016). This theory supports the individual's growth and enables the students to explore their learning potential. Despite the theorists" different definitions of learning, a majority are agreed that learning happens when experience leads to a constant change in the individual's knowledge or manner (Weiten, 2012). What is meant by „experience" in this definition is „the practical interaction of the person with his or her environment" (Woolfolk, 2016: 196).

2.7.2 Constructivism and Constructionism Theories

According to Hamdi (2013), the theory and application of ICT attracts systematic methods through inter-related theories in technology, psychology and education to develop its bases, principles, and applications for higher education. The influence of technology on almost all aspects of contemporary life is profound, and the field of education is no exception. In fact, the notion of using machines to provide individually paced learning and instant feedback in order to improve education was widely explored at a time when a single electronic computer still filled an entire room (Casas, 2012). Today's students are the first generation of young people to have lived their entire lives in a society shaped by computer technology, and unlike previous generations, they will never experience a world without it (Niles, 2016).

Partly in reaction to didactic approaches such as behaviourism and programmed instruction, constructivists have argued that learning is an active, contextualized process of constructing knowledge rather than acquiring it. This theoretical stance actively opposes traditionalist, didactic, transmissions of knowledge. Seymour Papert and Idit Harel in their book Situating Constructionism (2011) use the terms constructivism and construction almost interchangeably, but use „Constructionism" as it applies to Learning Theory. „Constructionism" the N word as opposed to the V word--shares constructivism's connotation of learning as "building knowledge structures" irrespective of the circumstances of the learning. It then adds the idea that this "happens especially felicitously in a context where the learner is consciously engaged in constructing a public entity, whether it's a sand castle on the beach or a theory of the universe" (Papert & Harel, 2011, p. 1).

Theorists like Ackerman (2011), also see a smooth transition between constructivism and constructionism, between Piaget (2009) and Papert, seeing constructionism largely as a more situated learning theory, especially valuable in cybernetics and more socially contexted than Piaget's earlier work. She states:

„Papert's constructionism, in other words, is both more situated more pragmatic than Piaget's constructivism [or Vygotsky's socio constructivism asserts that learning is an active, constructive process. The learner is an information constructor. The learner actively constructs or creates his/her own subjective representations of objective reality. New information is linked to prior knowledge, existing schemata always activated (Ackerman, 2011, p.5).

2.8 Conceptual Framework

Conceptual framework is the diagrammatic presentation of the study's variables. This study's variables are effectiveness of educational technology, creative fashion designing, availability of educarional technology facilities and challenges facing the effective use of educational technology.
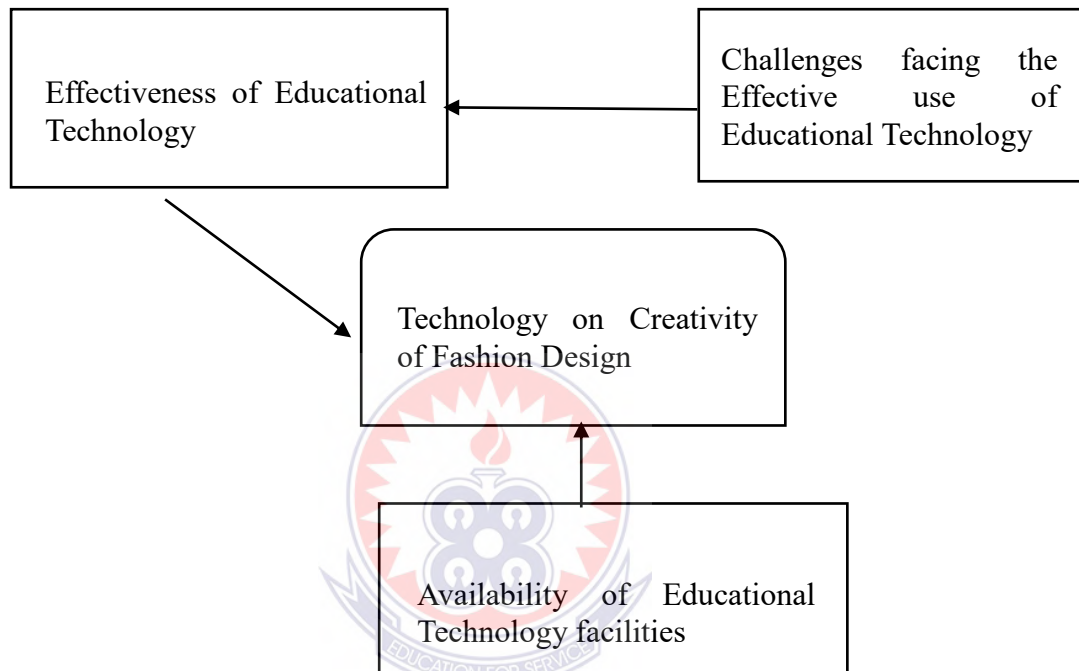
Figure 2.1 presents the conceptual framework of the study.
Source: Researcher's Construct, 2022

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The chapter describes the research design, the population, the sampling techniques used, the data collection instruments, validity and reliability of the instruments, data collection procedure and data analysis procedure.

3.2 Research Approach

Research approach is divided into two groups namely deductive (quantitative) and inductive (qualitative). The relevance of assumptions to the study is the main distinctive point between these two approaches. Deductive approach tests the validity of theories or hypotheses in hand, whereas inductive approach contributes to the development of new theories and generalizations (Dudovskiy, 2016). Quantitative research is generally related with the positivist paradigm. It involves collection and conversion of data into numerical form for statistical computations in which conclusions is drawn (Bryman, 2008). The quantitative research insists on deductive reasoning which moves from the general to the specific. This approach sometimes is known as a top-down approach. The validity of conclusions is shown to be dependent on one or more other premises being valid.

Basically, this study used quantitative approach. Quantitative approach was used to obtain data through questionnaires toward the existing situation and these findings on other hand would be analyzed statistically SPSS software as part of quantitative approach. The analysis enabled the researcher to determine how independent variables influence dependent variable.

3.2.1 Justification of the Quantitative Approach

Researchers should bear in mind that methods used to conduct the research need to align with the research questions (Punch 2008). In other words, data which need to be collected should be enough in answering the research question. Amaratunga et al. (2012) maintained that quantitative research can help a researcher to gather strong evidence through statistical analysis on the relationship between dependent and independent variables. Undoubtedly, results obtained from statistical analysis can provide directions of relationships when mixed with theory and literature. Neuman (2007 p.63) defined the quantitative approach as "an organized method for combining deductive logic with precise empirical observations of individual behavior in order to discover and confirm a set of probabilistic causal laws that can be used to predict general patterns of human activity."

Thus, this study aimed to measure underlying variables based on Cavana et al. (2011 p.106) who stated, "measurement of the variables in the theoretical framework is an integral part of research and an important aspect of quantitative research design". Furthermore, the advantages of using a quantitative approach can provide a researcher with in-depth explanations of quantitative enquiry. Cavana et al. (2011) and Amaratunga et al. (2012) emphasized this method can provide strength in reliability and validity for the constructs. Because the objective of this study was to empirically investigate a causal relationship between the underlying constructs, this methodology was deemed to be appropriate (Churcill & Suprenant 2012).

3.3 Research Design

The study utilized explanatory research design which according to Bryman (2001) is that branch of social scientific investigations which studies large and small

populations or universe by selecting and studying samples chosen from the population to discover the relative incidence, distribution and interrelations. Explanatory research is conducted for a problem that was not well researched before, demands priorities, generates operational definitions and provides a better-researched model. Explanatory research is actually a type of research design that focuses on explaining the aspects of the study (Babbie & Mouton, 2002).

The researcher starts with a general idea and uses research as a tool that could lead to the subjects that would be dealt with in the incoming future. It is meant to provide details where a small amount of information exists for a certain product in mind of that researcher (Bryman 2001).

Explanatory research is conducted in order to help find the problem that was not studied before in-depth. Explanatory research is not used to give researcher some conclusive evidence but helps us in understanding the problem more efficiently. When conducting the research, the researcher should be able to adapt himself/herself to the new data and the new insight. It does not aim to provide final and conclusive answers to the research questions but allows the researcher to explore the research with a varying level of depths. Also, it has been noticed that exploratory research is the examination, which shapes the foundation for different inquiries about, it is the building obstruct for alternate looks into. "It is the building block for the other researchers" (Bryman, 2001 p.2).

It can even help in deciding the exploration configuration, testing philosophy and information gathering strategy. Research allows the researcher to tackle such problems where no or less research has been done. The use of this method also provided a better view of the issues under research from several angles rather than to look at it from a

single perspective. The implication is that it was not possible to reach the entire population hence the need for choosing a representative sample (Babbie & Mouton, 2002). This study employed this design to assess the impact of technology on creativity of fashion design trainees in Vocational Training Institutes in the Volta Region of Ghana.

3.3.1 Justification for the use of Explanatory Research

Explanatory research was used with the aim of helping researchers to study the problem in greater depth and understand the phenomenon efficiently. In carrying out the research process, it was necessary to adapt to new findings and knowledge about the subject. Although it is not possible to obtain a conclusion, it is possible to explore the variables with a high level of depth (Babbie & Mouton, 2002).

Explanatory research allows the researcher to become familiar with the topic to be examined and to design theories to test them. This method is extremely valuable for social research (Babbie & Mouton, 2002). They are essential when one wants to convey new data about a point of view on the study. Explanatory research allows researchers to find a phenomenon that was not studied in depth. Although it does not give a conclusion of such a study, it helps to efficiently understand the problem. People who conduct explanatory research, do so with the objective of studying in detail the interaction of the phenomenon. Therefore, it is important to have enough information to carry it out.

The study used the mixed method triangulation research design. Bryman (2001) defined mixed method design as a research design with philosophical assumptions as well as quantitative and qualitative methods. According to Bryman, this design allows the researcher to collect and analyze data or information using both qualitative and

quantitative approaches in order to produce a better and in-depth understanding of the research questions.

3.4 Population

A study population therefore refers to the entire group of people to whom researchers wish to generalize the findings of a study, including persons who did not participate in the study (Babbie & Mouton, 2002). The population of the study was made up of all fashion design trainees in three selected Vocational Training Institutes in the Volta Region of Ghana. The three vocational training institutes selected were Caring Sisters Vocational Training Institute (45 trainees), Atorkor Vocational Training Institute (49 trainees), and Kedzi ICC (18 trainees). These three vocational training institutes were selected based on proximity, accessibility and their willingness to participate in the study. The total population of the study was 112 trainees and 10 tutors.
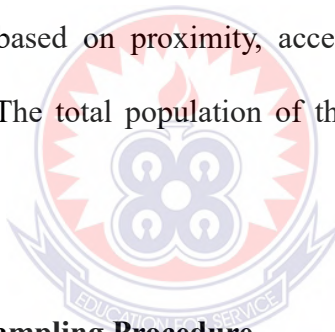
3.5 Sampling Size and Sampling Procedure

Census method was used to select all the 112 trainees. Census method refers to the complete enumeration of a universe (Creswell, 2013). A universe may be a place, a group of people or a specific locality through which data are collected. In contrary this method is not applicable as well as needed to some social problems because it is costly and time consuming. It is difficult to study the whole universe because financial aid is required for it to complete the study.

The study used census method because data collection through census method gives opportunity to the investigator to have an intensive study about a problem. The investigator gathers a lot of knowledge through this method. In this method there were higher degrees of accuracy in data. No other method is accurate like census method

when the universe is small. This method is also applicable for units having heterogeneity or difference. In certain cases, this method is very important and suitable to be used for data collection. Without this method the study of a universe remains uncompleted (Bryman, 2008).

A sample size of 122 comprising 112 trainees and 10 tutors were used to collect data for the study.

3.6 Data Collection Instruments

The instruments used for this research were questionnaire. The researcher used questionnaire because of its advantages like; easy to administer on a large population which is largely literate. Questionnaire require less time and money compared to other methods like focus group discussions (Creswell, 2014). The questionnaires contained items on a Likert-type scale. All of the questions were closed-ended. Questionnaire for the respondents had four main sections, i.e., section A and D. Section A collected data on respondent's background information. Section B would evaluate the effectiveness of educational technology on creative fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana. Section C would assess the level of availability of educational technology facilities in selected Vocational Training Institutes in the Volta Region of Ghana and section D would investigate the problems facing the effective use of educational technology in the teaching and learning of fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana. All of the questions were of 5-point scale ranging from strongly disagree (1) to strongly agree (5).

3.7 Pre-Testing of Questionnaires

A pre-test was conducted to ascertain any need for revisions. The pre-test involved administration of the questionnaires to 12 respondents at the selected schools. Participants of the pre-test were asked to complete the questionnaires and to provide comments or suggestions for revising any ambiguous item. The final instruments for the study were produced after subsequent revisions in the wording of a few items. The reliability of the instruments was determined using Cronbach's alpha analysis.

3.8 Validity and Reliability

The internal consistency of the research instrument was tested using the Cronbach's Alpha (Ndubisi, 2006). The reliability test yielded a Cronbach Alpha of 0.881 indicating high reliability. The reliability and initial evidence of validity were reported based on results from Cronbach's alpha reliability. A Cronbach's alpha of more than 0.70 is required to indicate the internal consistency among items within instrument constructs (Alam & Mohammed, 2010). An overall Cronbach alpha of 0.88 was achieved in this study, which means that the constructs were therefore deemed to have adequate reliability.

As indicated in Table 3.1, the Cronbach''alpha for the effectiveness of educational technology is 0.90, Availability of educational technology facilities, 0.85 and Problems facing the effective use of educational technology, 0.83. Hence, all the Cronbach alpha values were 0.83 and above benchmark which indicates that the instrument is reliable for the various constructs. Factor loadings were carried out to determine if the responses gathered can be grouped according to items in each of the dimensions and thus testing convergent validity. Convergent validity is interfered

when items loading is above 0.70 (Shropshire & Kadlec, 2012). As indicated in Table 3.1, most constructs achieved an excellent level of reliability and factor loading for each item resulting in convergent validity.

Table 3.1: Validity and reliability test results

Construct Variable	Item	Validity - Factor Loading	Reliability - Cronbach's α
The effectiveness of educational technology (EET)			
	EET1	0.842	
	EET2	0.856	
	EET3	0.962	0.90
	EET4	0.714	
	EET5	0.958	
	EET6	0.923	
Availability of educational technology facilities (AETF)	AETF1	0.885	
	AETF2	0.877	
	AETF3	0.828	0.85
	MGT4	0.800	
	AETF5	0.782	
	AETF6	0.840	
Problems facing the effective use of educational technology (PFEET)	PFEET1	0.749	
	PFEET2	0.809	
	PFEET3	0.764	
	PFEET4	0.804	0.83
	PFEET5	0.749	
	PFEET6	0.838	
	PFEET7	0.823	

Source: Survey, 2021

3.9 Data Collection Procedures

According to Kothari (2015), data collection procedures comprises of the steps and actions necessary for conducting the research effectively and the desired sequencing of these steps. The researcher embarked on the process of collecting data from the field upon preparation of a research proposal which was assessed, corrections effected and

research permit obtained from AAMUSTED. With the research permit obtained, the researcher started distributing the questionnaires to the fashion design trainees and their tutors of the selected vocational training institute.

In order to increase the return rate, the researcher adopted the steps proposed by Wiseman and McDonald (2010). These steps involved preparing cover letters attached to each questionnaire disclosing the significant of the study as well as assuring the respondents of the researcher's commitment to confidentiality. In this study, the researcher self-administered the data collection instruments to the respondents in batches of ten copies each, systematically until all were exhausted.

Given that the researcher was committed to collecting the desired data, the respondents were advised to complete the questionnaire in the presence of the researcher in order to address cases of misunderstandings that may arise. In the event that the respondents were not prepared to complete the questionnaire due to any other reason, arrangements would be made for the questionnaire to be collected later by the researcher for purposes of enhancing questionnaire return rate.

The researcher would personally administer the questionnaire which required the respondent to choose based on the Likert scale from questions designed by the researcher for easy purposes. All the respondents would be informed of the objectives and design of the study. Emphasis would be placed on the fact that the findings are primarily for academic purposes. Respondents were familiar with answering of questionnaires. All the respondents had some experience in completing questionnaires and were generally not apprehensive.

There was uniform question presentation and no middle-man bias. The researcher's own opinions did not influence the respondent to answer questions in a certain

manner. There were no verbal or visual clues to influence the respondent. Three days were used to distribute and receive the answered questionnaires from the respondents.

3.10 Methods of Data Analysis

Given the fact that the study was descriptive in its major characteristics, descriptive statistics were used as main method of data analysis. The analysis of the data commenced with editing and inspection of the pieces of data in order to identify simple mistakes, items that were wrongly responded to and any blank space left unfilled by the respondents. The computer statistical package for social scientists (SPSS version 22) was used to process all the quantitative responses from the questionnaire. The questionnaire items were sorted, coded and fed into SPSS program to generate frequencies and percentages and data was presented using frequency distribution tables.

Thematic analysis was used to analyse that qualitative data. Thematic analysis is one of the most common forms of analysis in qualitative research. It emphasizes pinpointing, examining, and recording patterns (or "themes") within data. Themes are patterns across data sets that are important to the description of a phenomenon and are associated to a specific research question (Guest, 2012). Thematic analysis is best thought of as an umbrella term for a variety of different approaches, rather than a singular method. Different versions of thematic analysis are underpinned by different philosophical and conceptual assumptions and are divergent in terms of procedure (Guest, 2012).

Thematic analysis is used in qualitative research and focuses on examining themes within data. This method emphasizes organization and rich description of the data set.

Thematic analysis goes beyond simply counting phrases or words in a text and moves on to identifying implicit and explicit ideas within the data (Guest, 2012). Coding is the primary process for developing themes within the raw data by recognizing important moments in the data and encoding it prior to interpretation. The interpretation of these codes can include comparing theme frequencies, identifying theme co-occurrence, and graphically displaying relationships between different themes. Most researchers consider thematic analysis to be a very useful method in capturing the intricacies of meaning within a data set (Braun, & Clarke, 2016).

3.11 Ethical Considerations

According to Resnik (2011), there are several reasons for the adhering to ethical norms in research. Norms promote the aims of research, such as knowledge, falsifying or misrepresenting research data, promote the truth and avoid error. Moreover, since research often involves a great deal of cooperation and coordination among many different people in different discipline and institutions, ethical standards promote the value that are essential to collaborative work, such as trust, accountability, mutual respect and fairness. For instance, many ethical norms in research, such as guidelines for relationships, copyright, and patency policies, data sharing policies and confidentiality and peer reviews are designed to protect intellectual property interest while encouraging collaborations. Many of the ethical norms help to ensure that researcher can be held accountable to the respondents.

William (2016) lists some of the ethical issues as informed consent, confidentiality and anonymity. Given the importance of ethical issues in several ways, the researcher would avoid taking any ones" work and where someone's work was included, such were acknowledged. In the process of data collection, respondent's identities would be

concealed and any information obtained would be handled with utmost confidence. No harm of any nature was meted out on any respondent, an aspect of privacy was observed and any cruelty avoided.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

The main purpose of the study was to assess the impact of technology on the creativity of fashion design trainees in Vocational Training Institutes in the Volta Region of Ghana. The study was guided by some research objectives including evaluating the effectiveness of educational technology on creative fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana. Assessing the level of availability of educational technology facilities in selected Vocational Training Institutes in the Volta Region of Ghana and thirdly, to investigate the problems facing the effective use of educational technology in the teaching and learning of fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana.

4.2 Questionnaires Response Rate

The researcher administered 112 questionnaires to the trainees of the selected Vocational institutes in the Volta Region, out of which 111 questionnaires were answered and returned.
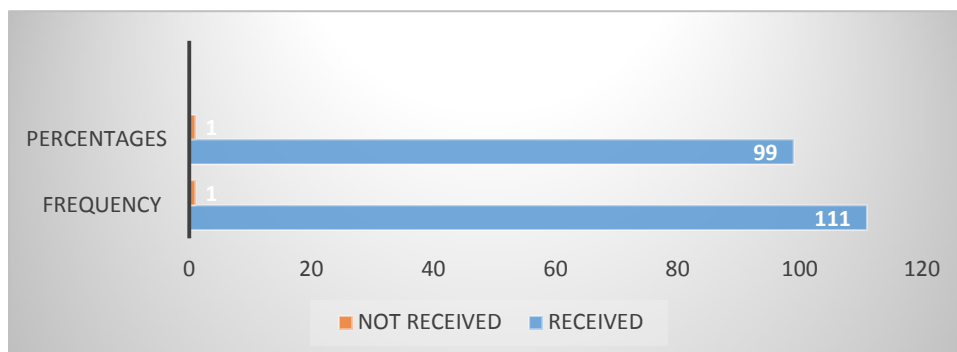
Figure 4.1 Response Rate

Source: Field survey, (2022), n= 111

4.3 Analysis of the Trainees Questionnaires

Table 4.1: Demographic Information of the respondents

Demographics	Frequency (N)	Percentage (%)
Gender		
Male	5	4.5
Female	106	95.5
Total	**111**	**100**
Age ranges of the respondents		
Below 15 years	43	38.7
19-26 years	68	61.3
Total	**111**	**100**
Highest educational background		
BECE	99	89.2
SSSCE/WASSCE/NVTI	12	10.8
Total	**111**	**100**

Source: Field Survey, (2022), n= 111

Table 4.1 shows that majority 106(95.5%) of the trainees were females while 5(4.5%) of the trainees were males. With regards to the age category of the trainees, 43(38.7%) of the trainees were below 15 years, 39(35.1%) of the trainees were between the age ranges 19-29 years, while 29(26.2%) of the trainees were between the age ranges 30-39 years.

Moreover, 99(89.2%) of the trainees were holding BECE as their highest academic certificates, while 2(10.8%) of the trainees possess SSSCE/WASSCE/NVTI certificates.

Research Objective 1: The effectiveness of educational technology on creative fashion designing in selected Vocational Training Institutes in the Volta Region of *Ghana.*

Table 4.2: The effectiveness of educational technology on creative fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana,

S/N	Statement(s)	Mean	±SD
1	Fashion educational technology professionals work very closely with fashion designers	4.27	0.63
2	Fashion illustrators also create other designs (eg. garments, shoes, fashion accessories)	4.23	0.67
3	Fashion illustrators are basically tasked to develop eye-catching drawings.	4.18	0.69
4	Fashion illustration professionals create integrated print ads and television commercials.	4.15	0.72
5	Educational technologists produce drawings and layouts used in catalogues, magazines, and other advertising media.	3.97	0.75
6	Educational technologists communicate fashion ideas through sketches, layouts, drafts and drawings	3.76	0.78
7	I believe sketch drawings include using paint, charcoals, computer programs.	3.73	0.84
8	Educational technologists select appropriate colour, sound, and animation for fashion concept.	3.68	0.92
9	Educational technologists maintain open communication with the fashion designers, art directors, and buyers.	3.64	0.94
10	Educational technologists develop fabric patterns and designs for manufacturing garments and wardrobes.	3.51	0.97
11	The computer is one of the most powerful creative tools an artist can possess.	3.42	0.99
12	Today‛s clothing industry comparatively prefers to use Computer-Aided Design (CAD) techniques.	3.38	1.21
13	Fashion illustration and technical drawings are used to visualize new clothing designs.	3.32	1.26

Source: Field survey, (2022), n= 111

Table 4.2 reveals that fashion educational technology professionals work very closely with fashion designers mean score of 4.27. This implies that the present nature of fashion calls for dressmakers to move along with the trend of producing innovative

and creative garments that are well fitting and also appealing to their customer's fashion sense.

Moreover, fashion illustrators also create other designs (eg. garments, shoes, fashion accessories) mean score of 4.23. Also, fashion illustrators are basically tasked to develop eye-catching drawings mean score of 4.18.

Also, fashion illustration professionals create integrated print ads and television commercials mean score of 4.15. Furthermore, educational technologists produce drawings and layouts used in catalogues, magazines, and other advertising media mean score of 3.97.

Educational technologists communicate fashion ideas through sketches, layouts, drafts and drawings mean score of 3.76. The trainees believe sketch drawings include using paint, charcoals, computer programs mean score of 3.73. This implies that the fashion industry has come a long way, as stated earlier, and has grown into one of the largest industries in the world.

Educational technologists select appropriate colour, sound, and animation for fashion concept mean score of 3.68. Educational technologists maintain open communication with the fashion designers, art directors, and buyers mean score of 3.64.

Educational technologists develop fabric patterns and designs for manufacturing garments and wardrobes mean score   of 3.51. Today's clothing industry comparatively prefers to use Computer-Aided Design (CAD) techniques mean score of 3.38.

Research Objective 2: The level of availability of educational technology facilities in selected Vocational Training Institutes in the Volta Region of Ghana.

Table 4.3: The level of availability of educational technology facilities in selected Vocational Training Institutes in the Volta Region of Ghana

S/N	Statement	Mean	±SD
1	ICT facilities needed for the teaching and learning of my program are available in my school.eg ICT Lab, engineering Software etc.	4.39	0.89
2	I am introduced to the use of ICT in my program from the beginning of my study	4.36	0.92
3	Tutors have to be pro-active and confident with the technology themselves	4.34	0.94
4	Practical ICT integrated environmental learning can support trainees to achieve a greater understanding of ICT education.	4.33	0.97
5	Fashion designers need to have a level of practical ICT skills in order to deal with technology	4.31	0.99
6	My school holds special training sessions and capacity building on the use of modern ICT software in my program of study	4.30	1.02
7	Tutors must feel confident in their skills to practically assist trainees learning in ICT.	3.78	1.05
8	8. Tutors need appropriate training on how to use ICT in teaching and learning.	3.65	1.08
9	School authorities must provide adequate computers and accessories to improve practical ICT teaching and learning	3.63	1.17
10	Tutors must incorporate practical ICT teaching and learning into their classrooms	3.61	1.19

Source: Field survey, (2022), n= 111

Table 4.3 indicates that ICT facilities needed for the teaching and learning of my program are available in my school.eg ICT Lab, engineering Software etc. mean score of 4.39.

Tutors have to be pro-active and confident with the technology themselves mean score of 4.34. Practical ICT integrated environmental learning can support trainees to achieve a greater understanding of ICT education mean score of 4.33.

Fashion designers need to have a level of practical ICT skills in order to deal with technology mean score of 4.31.

Tutors must feel confident in their skills to practically assist trainees learning in ICT mean score of 3.78. Tutors need appropriate training on how to use ICT in teaching and learning mean score of 3.65. School authorities must provide adequate computers and accessories to improve practical ICT teaching and learning mean score of 3.63. This means that Tutors must incorporate practical ICT teaching and learning into their classrooms.

Research Objective 3: The challenges facing the effective use of educational technology in the teaching and learning of fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana

Table 4.4: Ranking of the challenges facing the effective use of educational technology in the teaching and learning of fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana.

S/N	ITEM(S)	Mean	Rank
1	Lack of educational technology facilities and materials for training students	0.92	1st
2	Inadequate technical educational technology teachers or facilitators	0.88	2nd
3	Limited number of training institutions for technical teachers and difficulty in career progression.	0.85	3rd
4	The expensive nature of the programme	0.80	4th
5	Widespread concern about poor quality training and training environments	0.75	5th
6	Poor funding by the Government	0.72	6th

7	Negative public attitudes and perceptions regarding technical and vocational education and training.	0.68	7th
8	Mismatch between acquired skills and market needs	0.65	8th
9	Absence of educational technology career education	0.63	9th
10	Limited number of technical institutes	0.60	10th
11	The idea that the programme is for females	0.55	11th

Source: Field survey, (2022), n= 111

The problems facing the effective use of educational technology in the teaching and learning of fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana were ranked as lack of educational technology facilities and materials for training students mean score of 0.92 ranked 1st, Inadequate technical educational technology teachers or facilitators mean score 0.88 ranked 2nd. Limited number of training institutions for technical teachers and difficulty in career progression mean score 0.85 ranked 3rd.

The expensive nature of the programme with a mean score of 0.80, ranked 4th, widespread concern about poor quality training and training environments mean score of 0.75 ranked 5th. Poor funding by the Government mean score of 0.72 ranked 6th. Negative public attitudes and perceptions regarding technical and vocational education and training mean score of 0.68 ranked 7th. Mismatch between acquired skills and market needs mean score of 0.65 ranked 8th

Absence of educational technology career education mean score of 0.63 ranked 9th. Limited number of technical institutes mean score of 0.60 ranked 10th and the idea that the programme is for females mean score of 0.55 ranked 11th.

4.4 Analysis of Tutors Questionnaires

Five (5) Tutors were selected and targeted with questionnaire. The analysis of the Tutors questionnaire is presented below.

Table 4.5: Factors that influence the attitudes of teachers and students towards embracing ICT and its related software

Factors	Percentage	P- Value
Enhancing basic technology knowledge and skills	21.8	0.671
Adequate computer training	16.4	0.596
Motivating them to utilize ICT and computer	12.7	0.604
Support from government, schools in concern and other authorities demographics (age and gender)	20	0.607
Computer experience (training, years of using computer, ownership of computer, access to a computer, intensity of computer use)	18.2	0.792
Improving learning content	10.9	0.004*
Total	100	

P-value (Pearson,ş Chi-square for categorical variables) Statistical significance at P< 0.05 P-values with * are significantly different

Source: Field survey, 2022, n= 10

Table 4.5 shows that, with regards to the the factors that influence the attitudes of teachers and students towards embracing ICT and its related software the highlights were adequate computer training, ($p < 0.596$), Support from government, schools in concern and other authorities demographics (age and gender) ($p < 0.604$), Enhancing basic technology knowledge and skills ($p < 0.671$), Computer experience (training, years of using computer, ownership of computer, access to a computer, intensity of computer use) ($p < 0.792$), Motivating them to utilize ICT and computer ($p < 0.604$), and Improving learning content ($p < 0.004*$). The use of ICT enables opportunities for learning environments and practices that require interaction among individuals, co-operation with chances to experiencing learning, and the principles which constructionism supports. Many educational establishments work on supporting integrating technology into teaching and learning.

4.4.1 Computer Design

Majority of the Tutors said that, *Computer design is concerned with the hardware design of the computer.* Adding that, *once the computer specifications are formulated it is the task of the designer to develop hardware for the system. Computer design is concerned with the determination of what hardware should be used and how the parts should be connected.*

4.4.2 Tutor's sources of inspiration

Furthermore, greater percentage of the tutors agreed that Computer Aided Design is a system used in the designing field of study.

Table 4.5: Factors that influence the attitudes of teachers and students towards embracing ICT and its related software

S/N	Factors	Percentage (%)	Q- Value
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5	Computer experience (training, years of using computer, ownership of computer, access to a computer, intensity of computer use)	18.2	0.792
6	Improving learning content	10.9	0.004*
	Total	**100**	

P-value (Pearson,ṣ Chi-square for categorical variables) Statistical significance at P< 0.05 P-values with * are significantly different
Source: Field survey, 2022, n= 10

Table 4.5 shows that, with regards to the factors that influence the attitudes of teachers and students towards embracing ICT and its related software the highlights were adequate computer training, ($p < 0.596$), Support from government, schools in concern and other authorities demographics (age and gender) ($p < 0.604$), Enhancing

basic technology knowledge and skills ($p < 0.671$), Computer experience (training, years of using computer, ownership of computer, access to a computer, intensity of computer use) ($p < 0.792$), Motivating them to utilize ICT and computer ($p < 0.604$), and Improving learning content ($p < 0.004*$).

Table 4.6: Techniques used in teaching educational technology

Statement	1	2	3 n(%)	4 n(%)	5 n(%)
Instructional Design and teaching has to take the learner's prior knowledge into account if the educators want to achieve their educational aims and objectives.	0	0	(12.7)	(67.3)	(20)
Teachers need to draw upon large volumes of suitable practical resources that they can draw on for specific targets and adjust to meet the requirements of the students.	0	0	(3.6)	(63.6)	(32.7)
Teachers should help the students with important tasks rather than waiting for the students to „push computer buttons in response to easy questions from the teachers".	0	0	(5.5)	(56.4)	(38.2)
Teacher has to be pro-active and confident with the technology themselves.	0	0	(3.6)	(65.5)	(30.9)
The use of computer simulations while teaching in the classroom will not be successful unless teachers have the necessary skills and information to implement them effectively.	0	0	(7.3)	(61.8)	(30.9)

Source: Field survey, 2022, n= 10

Where; 1= strongly disagree, 2= disagree, 3= not sure, 4= agree, 5= strongly agree

Table 4.6 reveals that, 67.3% of the respondents agreed that Instructional Design and teaching has to take the learner's prior knowledge into account if the educators want to achieve their educational aims and objectives, 20% strongly agreed, while 12.7% were neutral. Moreover, 63.6% agreed that teachers need to draw upon large volumes of suitable practical resources that they can draw on for specific targets and adjust to meet the requirements of the students, 32.7% strongly agreed, while 3.6% were neutral. Traditionally, designers have made sketches of ideas with traditional tools and some designers still work in these ways. However, the methods are very slow for high volume production (Wolf, 2011). The writer believes that CAD terminals can include

sketch pads with electronic pens for drawing images into the computer. Previous drawings or actual fabric patterns can be scanned into the system with equipment that can read an image on paper and put it into the computer. All works can be saved and retrieved on command for updating. Seasonal colour palettes can be incorporated, with hundreds of thousands of colour options (including tints and shades).

Aboagye (2009), made a similar statement and he holds the view that using repeat generating programmes such as "Style Manager" by "Animated Images" (Lectra), an image may be scanned in and the designer may randomly select a small area to be repeated. With a few clicks of the mouse a fabric swatch is available for approval or dismissal. Instantaneous colour changes can also be made. This technique offers the designer a trial and error method that was previously, time consuming. He believes that this is one of the biggest benefits of CAD.

Also, 56.4% agreed that teachers should help the students with important tasks rather than waiting for the students to „push computer buttons in response to easy questions from the teachers", 38.2% strongly agreed, while 5.5% were neutral. Moreover, 65.5% agreed that Teacher has to be pro-active and confident with the technology themselves, 30.9% strongly agreed, while 3.6% were neutral. Alberta (2010), argues that while the benefits of CAD seem endless, there are some downsides as well. Before a business can purchase a system, time must be invested researching the large variety of software options currently on the market. Often, new hardware must be purchased to support the software. Once a company matches its needs with specific software, it has to plan ahead for training and support. Training, in some cases, accompanies the software purchase. In other cases training must be sought and can be time consuming and expensive. Training is also available in large cities by way of travelling seminars, acquired through college courses or offered by the individual software company.

To add more, 61.8% agreed that the use of computer simulations while teaching in the classroom will not be successful unless teachers have the necessary skills and information to implement them effectively, 30.9% strongly agreed, while 7.3% were neutral. Therefore this needs to become a more qualified development to increase a teacher's practical ICT skill (Ward and Parr, 2010). Other research has focused on the advantages that teachers gain from implementing ICT. For example, Hennessy et al., (2017) argues that teachers will benefit from the available technology in supporting students to build links between scientific theory and empirical evidence.

CHAPTER FIVE

DISCUSSIONS OF FINDINGS

5.1 Introduction

This chapter presents the discussions of findings on the data collected in relation to the specific objectives of the study. The discussions are made in line with the literature review and earlier studies conducted in the field of fashion design in TVET institutions.

5.2 Research Objective one sought to evaluate the effectiveness of educational technology on creative fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana.

On effectiveness of educational technology on creative fashion designing in research question one, the findings revealed that fashion educational technology professionals work very closely with fashion designers. This implies that the present nature of fashion calls for dressmakers to move along with the trend of producing innovative and creative garments that are well fitting and also appealing to their customer's fashion sense. Joseph-Armstrong (2010) asserted that, for garment producers to achieve success in garment designing, they must have in-depth knowledge about design analyses, figure analyses, taking accurate body measurement, and finally, know how to apply the dart principles even in freehand cutting, in creating and cutting unique styles. All these elements come to play when a dressmaker wants to construct a garment that is unique and well fitting.

It was also found that fashion illustrators also create other designs (eg. garments, shoes, fashion accessories). Also, fashion illustrators are basically tasked to develop eye-catching drawings. Presently, styles are getting more complicated with each

passing day; from Kente cloth sewn into wedding gowns to African wax print cloths that are used to make everything for all walks of life, dressmakers have to be very knowledgeable about the fundamental elements that influence the dynamism of fashion. The Ghanaian dressmaker can do more in garment designing, if attention is paid to darts and their principles that make clothing articles unique. This research therefore assesses the knowledge base of dressmakers‟ on darts and the application of dart principles (dart manipulation, adding fullness and contouring) in garment designing.

It was also revealed that fashion illustration professionals create integrated print adverts and television commercials. Furthermore, educational technologists produce drawings and layouts used in catalogues, magazines, and other advertising media. Markwei, (2009) agrees with Thornton and stated that the untrained artists have access to the computer software which makes designing easier and faster. Nevertheless, many people think they can do design without any formal training. It is obvious that, when graphic design started and it was all about drawing and painting of the advertisement, it was left for the professional artists. The researcher, on his part, believes that it is very important to have basic skills in formal and informal training for all designing sectors. However, the advent of computers has contributed rather positively to the design industry than its minor disadvantages.

It was again found that educational technologists communicate fashion ideas through sketches, layouts, drafts and drawings. The trainees believe sketch drawings include using paint, charcoals, computer programs. This implies that the fashion industry has come a long way, as stated earlier, and has grown into one of the largest industries in the world. In view of this, the use of technology in this field has increased. Fashion designing software are increasingly being used by fashion designers.

According to Wolfe (2018) Fashion design software greatly aid the work of a fashion designer and help in more effective performance. They help in saving a lot of time, money and energy. These software packages help the designer in experimenting with a number of textures, colours and patterns for producing the perfect designs. They provide a variety of sketch backgrounds, tools for designing and repeating patterns and texture mapping.

The study further revealed that educational technologists select appropriate colour, sound, and animation for fashion concept. Educational technologists maintain open communication with the fashion designers, art directors, and buyers. There are various fashion design software packages available in the market today, such as Adobe Photoshop, Adobe Illustrator, CorelDraw, Digital Fashion Pro among others. Fashion designers have often been observed to use particular software according to their own individual requirements. They aid the designer right from the stage of designing to the production of apparel. The process of creating an illustration, design or a pattern as well as cutting has become easier with the help of software. Designs and illustrations can be made faster and more accurately.

Again, educational technologists develop fabric patterns and designs for manufacturing garments and wardrobes. Some have a number of basic designs incorporated in the software, which the designer can make use of. The designers can make modifications in the basic designs and personalize them. Even 2D and 3D formats of a design can be created. These designs can be printed or sent to other sections through e-mail on soft copies.

Also, today's clothing industry comparatively prefers to use Computer-Aided Design (CAD) techniques. In practice, Computer Aided Design could be defined as the use of computer technology to assist the design process. Specialized CAD programmes

exist for various types of design: architectural, engineering, electronics, civil, and woven fabrics to name a few. However, there are many acronyms associated with the CAD system that tend to define the right type of system in context.

Fashion illustration and technical drawings are used to visualize new clothing designs mean score of 3.32. Sayem et al. (2009) opine that today's clothing industry comparatively prefers to use computer-aided design (CAD) techniques for both fashion design and pattern creation as it offers greater efficiency and time-saving solutions to many complicated tasks as well as facilitating Internet-based communication amongst designers, manufactures and retailers. This suggests that Computer Aided Design has become part of the designing instrument of today because of the benefits that can be derived from the system.

Traditionally, designers have made sketches of ideas with traditional tools and some designers still work in these ways. However, the methods are very slow for high volume production (Wolfe, 2018). The writer believes that CAD terminals can include sketch pads with electronic pens for drawing images into the computer. Previous drawings or actual fabric patterns can be scanned into the system with equipment that can read an image on paper and put it into the computer. All works can be saved and retrieved on command for updating. Seasonal colour palettes can be incorporated, with hundreds of thousands of colour options (including tints and shades).

5.3 Research Objective two sought to assess the level of availability of educational technology facilities in selected Vocational Training Institutes in the Volta Region of Ghana.

On level of availability of educational technology facilities in research objective two, the study also found that ICT facilities needed for the teaching and learning of

my program are available in my school.eg ICT Lab, engineering Software etc. The trainees revealed that they are introduced to the use of ICT in their program from the beginning of the study. The computer is one of the most powerful creative tools an artist can possess, and it is well on its way to revolutionizing the making of visual art just as word processors have transformed the way most people write. The Oxford Dictionary (2000) defines Computer Aided Design as the use of computers to design machines, buildings, vehicles and so on. Wolfe (2018) also defines CAD as a computer system used for designing textiles, apparel and other products.

Also, tutors have to be pro-active and confident with the technology themselves. Practical ICT integrated environmental learning can support trainees to achieve a greater understanding of ICT education. Designers of today function in an environment that is characterized by increased competition, enhanced consumer awareness, and rapidly-developing technology. In order to adapt to and thrive in this changing environment, it is essential to understand how these changes influence the creative process. This study contributed to a better understanding of the creative process in today's luxury industry and the effect of technology, specifically Internet technology, on creativity.

The study also found that fashion designers need to have a level of practical ICT skills in order to deal with technology. The trainees added that the school holds special training sessions and capacity building on the use of modern ICT software in my program of study. The concept of technology and creativity development in the fashion industry began with the birth of the *Haute Couture*. Charles Frederic Worth and his contemporaries were the first entrepreneurs to create a label and sew that label inside the garments produced (Grumbach, et. al., 2017). This ingenious marketing tool created desire and demand for garments possessing that label, or brand, only. From

that point forward the *designer label* has been a hallmark of quality and desire. The notoriety of a designer brand can entice the consumer to purchase more than apparel.

The study also found that tutors must feel confident in their skills to practically assist trainees learning in ICT. Tutors need appropriate training on how to use ICT in teaching and learning. School authorities must provide adequate computers and accessories to improve practical ICT teaching and learning. This means that Tutors must incorporate practical ICT teaching and learning into their classrooms. Also, the images created by fashion illustration professionals are commonly integrated in print adverts, television commercials, and online advertisements. The images created by fashion illustration professionals are commonly integrated in print ads, television commercials, and online advertisements. Although, fashion illustrators are mainly tasked to make sketches, layouts, or images, they are still expected to fulfil other duties which may include creation of designs for garments, shoes, fashion accessories, and other apparels with the use of imaging software programs like Photoshop, Illustrator and others (International Academy of Design and Technology, 2011).

In connection with the above idea, some basic functions of fashion illustration can be addressed through:

i.   Creating designs for garments, shoes, fashion accessories, and other apparels.

ii. Bringing the vision of the fashion designs to life through the illustration of the actual design plan.

iii. Sketching drawings using various mediums including paint, charcoals, coloured pencils, and computer software programs.

iv. Produce drawings and layouts that will be used in catalogues, magazines, brochures, flyers, commercials and other advertising media.

v.   Communicate fashion ideas through sketches, layouts, drafts and drawings

vi.   Select the appropriate colour, sound, and animation that will go well with the fashion concept developed.

vii.   Develop fabric patterns and designs that will be used for manufacturing garments and wardrobes.

5.4 Research Objective three sought to investigate the challenges facing the effective use of educational technology in the teaching and learning of fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana

On challenges facing the effective use of educational technology in the teaching and learning of fashion designing research objective three, the study found that the problems facing the effective use of educational technology in the teaching and learning of fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana were ranked as lack of educational technology facilities and materials for training students, inadequate technical educational technology teachers or facilitators and limited number of training institutions for technical teachers and difficulty in career progression. Although, the above statement is true, considering the operational processes of the garment manufacturing companies, the fact still remains that the advantages of the CAD system out-weighs the disadvantages and challenges of traditional methods. Thornton, (2016), made some comments on the low level of creativity in publications by design professionals and blames all that is happening on the advent of computers.

According to him, untrained individuals have access to inexpensive tools that can be used for a variety of publications. New software has templates that facilitate the creation of newsletters, logos, announcements, letterheads, business cards, and home

pages on the World Wide Web. With this comment he believes that the advent of computer is a threat to the graphic design profession.

The study found that the expensive nature of the programme, widespread concern about poor quality training and training environments; Poor funding by the Government; Negative public attitudes and perceptions regarding technical and vocational education and training; and Mismatch between acquired skills and market needs were some challenges. . Increased consumer awareness of global fashion trends most certainly affects a designer's work, for the fashion process is built around mystery and surprise; maintaining those two elements in this new paradigm is quite challenging, yet essential to selling success. This study explored the fashion designer's perception of the influence of the Internet on the designer's role in the creative process.

On fashion designer's perception of the influence of the Internet on the designer's role in the creative process, the study also found that absence of educational technology career education; Limited number of technical institutes and the idea that the programme is for females. In the 20th and 21st centuries, many scholars attempted to define practical teaching and learning. These definitions became theories of teaching and learning, created to try and clarify the meaning of both. Learning theories provide individuals with conceptual frameworks of interpretation for the act of learning, and show us where to look for solutions to practical problems. Teaching methods are in the main based on theories of learning. The most important learning theories are Behaviourism and Constructivism. These two approaches are based on two main schools of psychology that have influenced learning theory.

On factors that influence the attitudes of teachers and students towards embracing ICT and its related software, the study revealed adequate computer training, Support

from government, schools in concern and other authorities demographics (age and gender), Enhancing basic technology knowledge and skills, Computer experience (training, years of using computer, ownership of computer, access to a computer, intensity of computer use), Motivating them to utilize ICT and computer, and Improving learning content. The use of ICT enables opportunities for learning environments and practices that require interaction among individuals, co-operation with chances to experiencing learning, and the principles which constructionism supports. Many educational establishments, work on supporting integrating technology into teaching and learning.

On techniques used in teaching educational technology, the study found that Instructional Design and teaching has to take the learner's prior knowledge into account if the educators want to achieve their educational aims and objectives.

Also, teachers should help the students with important tasks rather than waiting for the students to „push computer buttons in response to easy questions from the teachers. Again, teacher has to be pro-active and confident with the technology themselves.

The study also found that the use of computer simulations while teaching in the classroom will not be successful unless teachers have the necessary skills and information to implement them effectively. Traditionally, designers have made sketches of ideas with traditional tools and some designers still work in these ways. However, the methods are very slow for high volume production (Wolfe, 2018). The writer believes that CAD terminals can include sketch pads with electronic pens for drawing images into the computer. Previous drawings or actual fabric patterns can be scanned into the system with equipment that can read an image on paper and put it into the computer. All works can be saved and retrieved on command for updating. Seasonal

colour palettes can be incorporated, with hundreds of thousands of colour options (including tints and shades).

Aboagye (2009), made a similar statement and he holds the view that using repeat generating programmes such as "Style Manager" by "Animated Images" (Lectra), an image may be scanned in and the designer may randomly select a small area to be repeated. With a few clicks of the mouse a fabric swatch is available for approval or dismissal. Instantaneous colour changes can also be made. This technique offers the designer a trial-and-error method that was previously, time consuming. He believes that this is one of the biggest benefits of CAD.

On the open ended questionnaire, majority of the *Tutors said that, "Computer design is concerned with the hardware design of the computer". Adding that, "once the computer specifications are formulated it is the task of the designer to develop hardware for the system. Computer design is concerned with the determination of what hardware should be used and how the parts should be connected".*

Also, greater percentage of the tutors agreed that Computer Aided Design is a system used in the designing field of study. They added that, Computer-aided design (CAD) is the use of computers (or workstations) to aid in the creation, modification, analysis, or optimization of a design. This software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing. Designs made through CAD software are helpful in protecting products and inventions when used in patent applications. Sayem et al. (2009) opine that today's clothing industry comparatively prefers to use computer-aided design (CAD) techniques for both fashion design and pattern creation as it offers greater efficiency and time-saving solutions to many complicated tasks as well as facilitating

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Internet-based communication amongst designers, manufactures and retailers. This suggests that Computer Aided Design has become part of the designing instrument of today because of the benefits that can be derived from the system.

CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The chapter comprised the summary of the findings of the study, conclusions drawn, recommendations of the study and suggestions for further studies.

6.2 Summary of Findings

The first objective of the study was to evaluate the effectiveness of educational technology on creative fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana. The study results reveal that fashion educational technology professionals work very closely with fashion designers mean score of 4.27. Moreover, fashion illustrators also create other designs (eg. garments, shoes, fashion accessories) mean score of 4.23. Also, fashion illustrators are basically tasked to develop eye-catching drawings mean score of 4.18.

To add more, fashion illustration professionals create integrated print ads and television commercials mean score of 4.15. Furthermore, educational technologists produce drawings and layouts used in catalogues, magazines, and other advertising media mean score of 3.97. Educational technologists communicate fashion ideas through sketches, layouts, drafts and drawings mean score of 3.76.

The trainees believe sketch drawings include using paint, charcoals, computer programs mean score of 3.73. Educational technologists select appropriate colour, sound, and animation for fashion concept mean score of 3.68. Educational technologists maintain open communication with the fashion designers, art directors, and buyers mean score of 3.64. Educational technologists develop fabric patterns and designs for manufacturing garments and wardrobes mean score of 3.51. Today's

clothing industry comparatively prefers to use Computer-Aided Design (CAD) techniques mean score of 3.38. Fashion illustration and technical drawings are used to visualize new clothing designs mean score of 3.32.

The second objective was to assess the level of availability of educational technology facilities in selected Vocational Training Institutes in the Volta Region of Ghana. The study findings indicate that ICT facilities needed for the teaching and learning of my program are available in the school. eg ICT Lab, engineering Softwares mean score of 4.39. The trainees revealed that they are introduced to the use of ICT in their program from the beginning of the study. Tutors have to be pro-active and confident with the technology themselves mean score of 4.34. Practical ICT integrated environmental learning can support trainees to achieve a greater understanding of ICT education mean score of 4.33.

Fashion designers need to have a level of practical ICT skills in order to deal with technology mean score of 4.31. The trainees added that the school holds special training sessions and capacity building on the use of modern ICT software in my program of study. Tutors must feel confident in their skills to practically assist trainees learning in ICT mean score score of 3.78.

Tutors need appropriate training on how to use ICT in teaching and learning mean score of 3.65. School authorities must provide adequate computers and accessories to improve practical ICT teaching and learning mean score of 3.63. This means that Tutors must incorporate practical ICT teaching and learning into their classrooms.

The third objective was to investigate the problems facing the effective use of educational technology in the teaching and learning of fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana. The problems facing the effective use of educational technology in the teaching and learning of fashion

designing in selected Vocational Training Institutes in the Volta Region of Ghana were ranked as lack of educational technology facilities and materials for training students mean score of 0.92 ranked 1st, Inadequate technical educational technology teachers or facilitators mean score 0.88 ranked 2nd. Limited number of training institutions for technical teachers and difficulty in career progression mean score 0.85 ranked 3rd. The expensive nature of the programme mean score of 0.80 ranked 4th.

Widespread concern about poor quality training and training environments mean score of 0.75 ranked 5th. Poor funding by the Government mean score of 0.72 ranked 6th. Negative public attitudes and perceptions regarding technical and vocational education and training mean score of 0.68 ranked 7th. Mismatch between acquired skills and market needs mean score of 0.65 ranked 8th.

Absence of educational technology career education mean score of 0.63 ranked 9th. Limited number of technical institutes mean score of 0.60 ranked 10th and the idea that the programme is for females mean score of 0.55 ranked 11th.

6.3 Conclusion

The study concluded that fashion educational technology professionals work very closely with fashion designers. Fashion illustrators also create other designs (eg. garments, shoes, fashion accessories) and they are basically tasked to develop eye-catching drawings. Educational technologists produce drawings and layouts used in catalogues, magazines, and other advertising media and they communicate fashion ideas through sketches, layouts, drafts and drawings. Clothing industry comparatively prefers to use Computer-Aided Design (CAD) techniques. Fashion illustration and technical drawings are used to visualize new clothing designs.

The trainees are introduced to the use of ICT in their program from the beginning of the study. Tutors have to be pro-active and confident with the technology themselves. Practical ICT integrated environmental learning can support trainees to achieve a greater understanding of ICT education. Fashion designers need to have a level of practical ICT skills in order to deal with technology. The trainees added that the school held special training sessions and capacity building on the use of modern ICT software in my program of study. Tutors felt confident in their skills to practically assist trainees learning in ICT. Tutors need appropriate training on how to use ICT in teaching and learning.

The problems facing the effective use of educational technology in the teaching and learning of fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana were lack of educational technology facilities and materials for training students, Inadequate technical educational technology teachers or facilitators. Limited number of training institutions for technical teachers and difficulty in career progression. The expensive nature of the programme.

Widespread concern about poor quality training and training environments. Poor funding by the Government. Negative public attitudes and perceptions regarding technical and vocational education and training. Mismatch between acquired skills and market needs. Absence of educational technology career education. Limited number of technical institutes and the perception that the programme is for females.

6.4 Recommendations

Based on the findings of the study and conclusion thereof, the following recommendations are made:

1. The government through the GES should procure the necessary ICT infrastructure for the selected schools to enable the teachers and students benefit maximally in the ongoing technological development and ICT contribution in educational advancement.

2. The Tutors should use ICT and practical teaching methods to improve students" skills in Vocational courses.

3. Tutors must use practical ICT expertise and improve students understanding of the vocational courses.

4. The teachers must use variety of teaching and learning methods to improve students understanding of the subject.

5. There is the need to organise periodic in-service training workshops to build teachers competencies and necessary skills in Vocational subjects and improve students"academic performance.

6. Students need to have a level of practical ICT skills in order to deal with fashion technology.

7. Tutors have to be pro-active and confident with the fashion technology themselves.

8. School authorities must provide adequate computers and accessories to improve practical teaching and learning.

6.5 Suggestions for Further Research

According to the conclusions and recommendations made, the study recommended that a similar study must be undertaken to evaluate the impact of in-service training on teachers"performance at work. The education system in Ghana needs an in-service training strategy that is functional and sustainable. The few in-service training programmes organised by the G.E.S are mostly general in nature and fails to adequately address the special needs of students in various subject areas.

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UNIVERSITY OF EDUCATION, WINNEBA

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APPENDIX A: QUESTIONNAIRE FOR THE TRAINEES

The researcher is a student of AKENTEN APPIAH-MINKA UNIVERSITY OF SKILLS TRAINING AND ENTREPRENEURIAL DEVELOPMENT conducting a piece of research to assess the impact of technology on creativity of fashion design trainees in Vocational Training Institutes in the Volta Region of Ghana. I respectively request that you form part of this research by completing the attached questionnaire. Anonymity and non-traceability are assured. It is my fervent hope that you participate in the study. Thank you for your valuable cooperation.

Section A: Demographic Information of the respondents

1. What is your gender?

   Female [   ]   Male [   ]
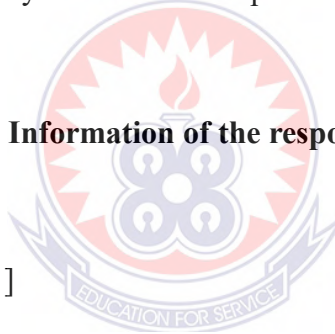
2. What age range do you belong?

Below 15 years [   ] 19-26 years [   ]

3. What is your highest educational background?

BECE [ ] SSSCE/WASSCE/NVTI [ ] Others [ ]

Section B: The effectiveness of educational technology on creative fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana.
Please rate using a scale of 1-5 where 1 represents strongly disagree, 2 represent disagree, 3 represents uncertain, 4 represents agree, 5 represents strongly agree. Please tick [√] in the box where appropriate

Statement(s)	1	2	3	4	5
Fashion educational technology professionals work very closely with fashion designers					
Fashion illustrators are basically tasked to develop eye-catching drawings.					
Fashion illustration professionals create integrated print ads and television commercials.					
Fashion illustrators also create other designs (eg. garments, shoes, fashion accessories)					
I believe sketch drawings include using paint, charcoals, computer programs.					
Educational technologists produce drawings and layouts used in catalogues, magazines, and other advertising media.					
Educational technologists communicate fashion ideas through sketches, layouts, drafts and drawings					
Educational technologists select appropriate colour, sound, and animation for fashion concept.					
Educational technologists develop fabric patterns and designs for manufacturing garments and wardrobes.					
Educational technologists maintain open communication with the fashion designers, art directors, and buyers.					
Fashion illustration and technical drawings are used to visualize new clothing designs.					
The computer is one of the most powerful creative tools an artist can possess.					

Statement (s)	1	2	3	4	5
Today's clothing industry comparatively prefers to use Computer-Aided Design (CAD) techniques.					
Fashion designers can use educational technology to make sketches of ideas.					

SECTION C: The level of availability of educational technology facilities in selected Vocational Training Institutes in the Volta Region of Ghana.

PLEASE TICK [√] THE MOST APPROPRIATE RESPONSE WHEN ANSWERING THE QUESTIONS BELOW.

Please rate using a scale of 1-5 where 1 represents strongly disagree, 2 represent disagree, 3 represents uncertain, 4 represents agree, 5 represents strongly agree. Please tick [√] in the box where appropriate

ITEMS	1	2	3	4	5
ICT facilities needed for the teaching and learning of my program are available in my school.eg ICT Lab, engineering Softwares etc.					
I am introduced to the use of ICT in my program from the beginning of my study					
My school holds special training sessions and capacity building on the use of modern ICT software in my program of study					
Fashion designers need to have a level of practical ICT skills in order to deal with technology					
Tutors have to be pro-active and confident with the					

	ITEMS	1	2	3	4	5
	Technology themselves					
	Tutors must feel confident in their skills to practically assist trainees learning in ICT.					
	Tutors must incorporate practical ICT teaching and learning into their classrooms					
	Tutors need appropriate training on how to use ICT in teaching and learning.					
	Practical ICT integrated environmental learning can support trainees to achieve a greater understanding of ICT education.					
	School authorities must provide adequate computers and accessories to improve practical ICT teaching and learning					

SECTION D: The problems facing the effective use of educational technology in the teaching and learning of fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana.

To what extent do you agree or disagree that the following are the problems facing the effective use of educational technology in the teaching and learning of fashion designing in selected Vocational Training Institutes in the Volta Region of Ghana? Please rate using a scale of 1-5 where 1 represents strongly disagree, 2 represent disagree, 3 represents uncertain, 4 represents agree, 5 represents strongly agree. Please tick [√] in the box where appropriate

Statement(s)	1	2	3	4	5
Lack of educational technology facilities and materials for training students					
Limited number of technical institutes					
Inadequate technical educational technology teachers or facilitators					
Limited number of training institutions for technical teachers and difficulty in career progression.					
Mismatch between acquired skills and market needs					
Widespread concern about poor quality training and training environments					
The expensive nature of the programme					
Poor funding by the Government					
Absence of educational technology career education					
The idea that the programme is for females					
Negative public attitudes and perceptions regarding technical and vocational education and training.					

Thanks for your cooperation

APPENDIX B

QUESTIONNAIRE FOR THE TUTORS

What is a computer design?

…….…………………………………………………………………………………

…………………………………………………………………………………….

Computer Aided Design is a system used in the designing field of study.

True [ ] False [ ]

Things that are used in teaching them?

…….…………………………………………………………………………………

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What is your source of inspiration?

…….…………………………………………………………………………………

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Which of the following factors influence the attitudes of teachers and students towards

embracing ICT and its related software?

A. Enhancing basic technology knowledge and skills   [   ]

B.   Adequate computer training   [   ]

C. Motivating them to utilize ICT and computer   [   ]

D. Support from government, schools in concern and other authorities demographics

(age and gender)   [   ]

E. Computer experience (training, years of using computer, ownership of computer,

access to a computer, intensity of computer use)   [   ]

F. Improving learning content   [   ]

Which factors, according to your experience, are barriers to the Integration of ICTs in TVET, both on the part of teachers and students?

A. Barriers of equipment and support [   ]   B.   Difficulty of using ICTs [   ]

C. High cost of programme development [   ]   D. Resistance to change   [   ]

E. difficulties in recruiting qualified instructors   [   ] F. Lack of planning   [   ]

G. Instructional difficulties   [   ]   H. Learner resistance [   ]

I. Difficulties in maintaining reliable technical assistance and support [   ]

Techniques used in teaching educational technology

Please rate using a scale of 1-5 where 1 represents strongly disagree, 2 represent disagree, 3 represents uncertain, 4 represents agree, 5 represents strongly agree. Please tick [√] in the box where appropriate

Statement(s)	1	2	3	4	5
Instructional Design and teaching has to take the learner's prior knowledge into account if the educators want to achieve their educational aims and objectives.					
Teachers need to draw upon large volumes of suitable practical resources that they can draw on for specific targets and adjust to meet the requirements of the students.					
Teachers should help the students with important tasks rather than waiting for the students to „push computer buttons in response to easy questions from the teachers‟.					
Teacher has to be pro-active and confident with the technology themselves.					

The use of computer simulations while teaching in the classroom will not be successful unless teachers have the necessary skills and information to implement them effectively.					