

**UNIVERSITY OF EDUCATION, WINNEBA
COLLEGE OF TECHNOLOGY EDUCATION, KUMASI**

**CIRCULAR ECONOMY: MINIMISING PAPER AND FABRIC WASTE IN
SELECTED FASHION INSTITUTIONS IN ACCRA**

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**MASTERS OF TECHNOLOGY EDUCATION IN FASHION AND
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SELECTED FASHION INSTITUTIONS IN ACCRA

BY

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This dissertation is presented to the Department of Fashion and Textiles Design
Education, Faculty of Vocational Education of University of Education, Winneba,
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Masters of Technology Education in Fashion and Textiles

DECEMBER, 2021

DECLARATION

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

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SUSSANA AFARI-KWARTENG

DATE

(STUDENT)



Supervisor's Confirmation

I confirm that the presentation of this dissertation was supervised by me and is in accordance with guidelines of University of Education, Winneba, College of Technology Education, Kumasi.

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Dr. JOSEPHINE NTIRI

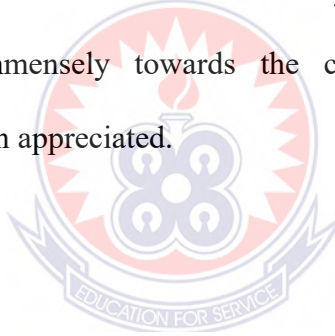
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DEDICATION

I dedicate this dissertation to God, my husband, my family and all fashion design students in Ghana.



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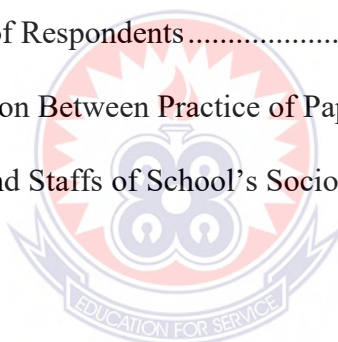
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LIST OF ABBREVIATIONS

CAD	Computer Aided Design
CE	Circular Economy
CGKFS	Catechist Georgina Korankyewaa Fashion School
DfS	Design for Sustainability
EPA	Environmental Protection Agency
GEMA	Ga East Municipal Assembly
JACCD	Joyce Ababio College of Creative Design
JHS	Junior High School
LI	Legislative Instrument
PHD	Doctor of Philosophy
SHS	Senior High School
SPSS	Statistical Package for Social Sciences
UNEP	United Nation Environmental Programme

ABSTRACT

The goal of the study was to assess the level of knowledge of Circular Economy by some fashion students and staffs of fashion institutions within the Ga East Municipality in Accra, how they manage fabric and paper scrap waste and practical ways of making use of the scrap waste. The mixed method approach was used as the methodology with a total population of 120 students and staff members from three selected fashion institutions in Accra. Data was collected from 70 students and 20 staff members using the purposive sampling method. The result indicated that the female gender dominated the fashion institutions used. Majority of student's respondents indicated they had no knowledge on circular economy, while most staff members showed knowledge on circular economy. There were various solutions suggested for the management of paper and fabric waste. For the waste to be managed well there were suggestions to make use of the scrap wastes produced and not just dispose them off. It was recommended that fashion projects on sustainability should be added to the curriculum by fashion institution to help reduce paper and fabric waste produced by students as well as to research and read on circular economy in the fashion industry. This study aimed to prove that garment production scraps could be transformed into timely artifacts like wall hangings to beautify walls. Scraps from different fabrics and paper were turned into creative wall hangings. Rather than just disposing the scraps into dustbins or burning them, this procedure will in turn be economically beneficial to the manufacturer, since these artefacts can also be sold. Choosing to add value to the scrap waste to come out with products and create an awareness of social responsibility is also shown with examples in this study.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Clothing, as defined by Kaiser (1997), is a significant tool for expressing one's stated identity or personal style. In the course of fabric and clothing production, the fashion industry wastes a significant number of textiles. Currently, post-consumer textile waste accounts for 5% of solid waste, and the majority of this textile waste that ends up in landfills causes environmental difficulties (UNEP, Waste Management, 2015). Paper waste from pattern making as well as fabric scraps from cutting, leftover fabrics from rolls, sampling yardage, damaged fabrics, clothing samples, unsold items, and second-hand clothing trash as are examples of this waste (Redress Design, 2021). The clothing industry's environmental impact, according to Schipani (2019), extends beyond emissions. Fabric and paper waste in the garment manufacturing sector is one of the most serious issues that manufacturers face. Many of these trashes end up in dumpsites or landfills, causing a slew of environmental problems.

Waste is a worldwide problem. Waste poses a threat to public health and the environment if it is not properly managed. It is a developing problem that is directly tied to how society produces and consumes. It is something that everyone is concerned about. Waste management is one of the most important utility services in 21st-century society, especially in urban regions. Waste management is a fundamental human necessity, as well as a basic human right (UNEP, Waste Management, 2015).

Chaplin (1999) agrees that the crucial challenge confronting many developing countries is the issue of sanitation and waste management to which Ghana is no exception. According to Coffie (2010) the increase in waste in developing countries can be attributed to increase in population and rapid urbanization. Sustainability in the fashion

industry is still a work in progress, and many scholars have recognized the need of researching how it may be achieved. Fashion designers and garment makers hence should be concerned about the social and ethical issues as well as economic necessities and should be aware of sustainable design strategies to more environmentally, socially and ethically conscious production

This dissertation investigates the importance of Circular Economy in the use of paper and fabric waste by fashion design students within some selected fashion institutions in Accra, Ghana. The dissertation aims at giving knowledge on how to reduce, reuse and create crafts works to generate additional income out of waste by adapting the Circular Economy way. This is to cause waste management shift from disposal towards recycling and other recovery ways.

1.2 Statement of the Problem

Fashion is widely considered the second most destructive industry after oil, to the environment (Moorhouse, 2017). The country is currently overwhelmed with so much waste that government and private agencies have not been able to address the problems of waste adequately, particularly, in the major cities in the country (Selby, 2010). This poses a threat on environmental health. In lieu of the above there is the need to create an alternative and more efficient way of managing waste. Increase in population means more schools, more schools mean more waste and more waste mean more pollution. Fabric and paper can also be wasted during the production process, trimming section, or during the printing and embroidery section within the fashion industry as well as schools (Bamisaye & Adeitan, 2018). Though some entrepreneurs do use some fabric and paper waste for creating some crafts this endeavor is not enough to lower the amount of waste from the schools.

1.3 Purpose of the Study

The purpose of the study is to introduce the knowledge of circular economy to students, evaluate how some selected fashion students in schools in Accra can convert their fabric and paper waste into practical uses by designing out waste and pollution and keeping products and materials in use. Mifetu (2021), mentioned that sustainability in the fashion industry is still a work in progress, and many scholars have recognized the need of researching how it may be achieved.

1.4 The Objectives of the Study Include the following:

1. To investigate paper and fabric waste management practices by some selected fashion schools in Accra.
2. To assess the level of knowledge of circular economy by students and staffs (teachers, administrators, cleaners) in selected fashion schools in Accra.
3. To design and produce paper and fabric wall hanging.

1.5 Research Questions

This research seeks to find answers to the following questions

1. How is paper and fabric waste managed within some selected fashion schools in Accra?
2. What is the level of knowledge of circular economy by students and staffs (teachers, administrators, cleaners) in some selected fashion schools in Accra?
3. What type of wall hanging can be designed and produced using paper and fabric scraps?

1.6 Significance of the Study

The study may serve as a useful guide to most fashion school owners and fashion design students on ways to make good use of paper and fabric waste produced and also help in reducing waste within the environment. The idea on Circular Economy theory will also bring to mind strategies and processes to adopt in order to create additional income with waste created.

The study would provide education on environmental management and aid in paper and fabric waste management within institutions.

1.7 Limitation of the Study

The study was anticipated to be carried out successfully but there were some limitations encountered. Limited time frame for the entire study was one of the constraints. Also, the difficulty in getting enough cash to print out questionnaires to the schools as well as paying for assistance to create questionnaires on google docs for some schools. The last constraint had to do with the unwillingness of respondents to answer questionnaires on time.

1.8 Delimitations of the study

The study was on paper and fabric waste management challenges, thus other types of waste such as liquid, industrial and health care management will not be investigated in this study. This was a deliberate effort to make the study manageable given the time and resources available to complete the study. The study was about the minimizing of paper and fabric waste in some selected fashion schools within the Ga East Municipality of Greater Accra. It was focused on fashion students both male and female and staffs (teachers, administrators, cleaners) of selected institutions.

1.9 Organization of the Study

The study covers six chapters. Chapter one serves as a general background to the study and therefore provides the context of the study with background to the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, limitation, delimitation and organization of the study. Chapter two contains related literature reviews. Chapter three has to do with the methodology, research design, population of the study, sample and sampling technique, population, data collection instrument and data analysis. Chapter four deals with results presentation. Chapter five deals with discussions from the findings. Chapter six concludes the study with summary, conclusion and recommendations.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Paper and fabric waste is a big problem and an inescapable scenario in the fashion business, according to Common Objective (2018). It occurs throughout the supply chain, during customer usage, and until the product is discarded at the end of its useful life. Paper and fabric waste originates in the manufacturing process and continues through the garment manufacturing process to the client, and these wastes come in a variety of forms. There have been varied investigations on circular economy and most of these have been discussed under topics like solid waste management (Appiah, 2015), sustainable waste management strategies in the fashion industry sector, (Fetanat et. al., 2019) and many more.

There is also a wide-range of literature on the subject of sustainability by both Western and African scholars. Although this study also brings concepts with regards to circular economy, this chapter notwithstanding, discusses and reviews some scholarly articles by both Western and African writers on waste management and sustainability. Even though these topics may overlap within the study of circular economy and sustainable fashion, for the sake of this research which is on fabric and paper waste, it is only works related to the subject matter which will be discussed.

This chapter delves into what paper and fabric waste are in terms of fashion institutional waste, the impact of paper and fabric waste, circular economy, sustainable fashion, paper and fabric upcycling and recycling, and ways to make use of paper and fabric waste.

2.2 Paper and Fabric Waste

Rapid changes in fashion phases increase the demand for new clothing, so that the basic physical need for clothes has become the least important factor for the selection of fashion. This means that new fashions are frequently purchased, and old yet usable clothes which may only have been used a few times are subsequently discarded (Birtwistle & Moore, 2007).

Fabric waste and paper trash, is a piece of fabric that the owner no longer considers usable for its intended use. Fabric scraps from cutting, leftover fabrics from rolls, pattern drafting paper left overs, sampling yardage, damaged fabrics, clothing samples, unsold items, and second-hand clothing waste are examples of this waste (Redress Design, 2021). Pre-consumer wastes, according to Agrawal et al., (2013), are by-products of the textile, fiber, paper, or fabric industries that are formed during production. Post-consumer fabric waste is clothing or textiles that the owner no longer wants to wear and can be thrown because they are worn out, out of style, or damaged.

Leftover papers however, are the papers that are left over after finished patterns have been generated, and leftover fabrics are the fabrics that are left over after the marker has been made and the garments have been cut out. Paper and fabric scraps, on the other hand, are smaller paper and fabric remnants found in between pattern components. They are naturally formed as the negative space between the pattern pieces after a pattern has been drafted and a garment has been cut (Mifetu, 2021).

Fabric scraps are known to generate significant economic losses in the fashion industry due to material and storage costs. Even with today's advanced technology, computer aided pattern preparation procedures, and pattern placing or cutting systems, the rate of fabric wastage cannot be reduced to a specific level. This figure is far too high to be

ignored, and unfortunately, these kinds of unavoidable scraps constantly happen (Koca, 2019).

In the textile industry, form is very important. If fashion designers want to support sustainable fashion, they should look for new ways to turn waste into profit.

In this study, the researcher focuses on paper and fabric scraps left after cutting as these remnants most often are sent to the dumping sites. According to Reverse Resources (2016), one cannot prevent cutting scraps and faults unless items are intended for zero-waste production; bigger production brings along larger numbers of leftovers per product. As a result, waste arises in a larger production, both in terms of quantity and product size. The fabric scrap, on the other hand, might be defined by the product's design or style. For money reasons, these remaining materials can be used for new discoveries and breakthroughs.

The quantities of waste generated in Ghana have been increasing rapidly and is projected to reach double figures in the not-too-distant future. Fabric waste accounts for roughly 5% of landfill area in the United States (Harmony, 2020). Despite this, only roughly 3.8 billion pounds of post-consumer textile waste is recycled each year, accounting for about 15% of total post-consumer trash, with the remaining 85% ending up in landfills. Kendie (1999) argued that, the recent upsurge in waste disposal problems comes from the fact that attitudes and mindsets of people towards waste and the rating of waste disposal issues in the scheme of official development plans have not been adequately considered.

2.3 Impact of Paper and Fabric Waste

Paper and fabric waste can arise at any point during the manufacturing process in the garment business. Bamisaye and Adeitan (2018) confirmed that paper and fabric might be wasted at any stage of the manufacturing process. First, there is the shop, where production-ready paper and fabrics are stored and dispatched. Second, in the cutting room, possibly as a result of the use of markers and cutting waste remains. Third, the factory floor, where the machine operator may discover a defective piece and discard it, or the machinist may damage part of the clothes during the stitching process. Last but not least, garments are trimmed, pressed, and packed for transportation in the finishing room; damage can occur at this point as well.

Some of these damages are recycled or reused, while the majority end up in dumpsites or landfills. Furthermore, according to Schipani (2019), the apparel sector has a negative impact on the environment. Another significant impact of fabric and paper waste on the environment is that it contributes to greenhouse gas emissions by leaking poisons and chemicals into the soil and ground water, which is hazardous to human health. These product particles that do not decompose end up destroying natural habitats and microbes (Cuc & Vidovic, 2014).

2.4 Circular Economy

According to Peralla (2011), the rising expense of waste disposal, as well as the emphasis on the significance of reducing, reusing, recycling, and recovering waste, has increased the value placed on waste. The Circular Economy model also sees waste as a resource for poverty reduction. It sees the current linear take-make-dispose system as broken.

The current waste explosion can be attributed to the economy technique. Rather than discarding, the circular economy waste concept takes resources in the circular economy that are no longer useful, undesired and turn them into new products. Approximately 80% of products that leave manufacturing companies are discarded within six months of their entire life cycle.

A Circular Economy (CE) is by definition regenerative, as it is founded on closed-loop principles. The concept of a Circular Economy CE is not new. It comes from Walter Stahel's 1976 report to the European Commission, "The Potential for Substituting Manpower for Energy" (Baker-Brown 2017, pg.10). It introduced the concept of circular economy in loops, with the goal of increasing work opportunities: economic competitiveness, reduced reliance on natural resources, and waste prevention. McDonough and Braungart (2002) expanded on this concept in their concept of Cradle to Cradle, which is a well-known principle for completing the loop in two different cycles: biological and technological.

A product is designed to have numerous life cycles or to be biodegradable according to this philosophy. Consequently, following the use phase, the product enters the technical or biological cycle. Composting is a part of the biological cycle, but it is not a part of the biological cycle. While just a few fibers can be composted, this is a viable solution for textiles. Textiles, on the other hand, contain dangerous substances that should not be used (Niinimäki, 2011). Closing the loop in the fashion industry is more likely to occur through a technological cycle (using textile waste to create new fibers and yarns).

A circular economy approach to fashion strives to create a more sustainable and closed-loop system, with the goal of extending garment use time and preserving the value of products and materials for as long as feasible. This means that all of the materials will

be recycled multiple times. Products are created to be part of a system in which all aspects contribute to circularity. Several lifecycles must be considered in the initial design.

MacArthur (2020), infers that circular economy involves progressively separating economic movement from the consumption of limited incomes and designing waste out of the system, MacArthur also referred to it as an industrial economy that is restorative by intention; aims to rely on renewable energy, minimize, tracks and eliminates the use of toxic chemicals; and eradicates waste through careful design.

MacArthur (2020) asserts that, circular economy is grounded on three principles

1. Design out waste and pollution; which is to find ways and means of getting products which does not add on to environmental waste and pollution.
2. Keep products and materials in use; this is to produce things that will be in constant use and be used up to trash.
3. Regenerate natural systems; to not only be mindful of protecting the environment but also find ways of improving it.

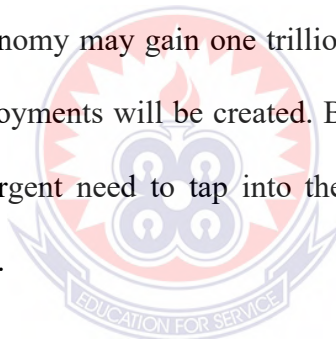
In 2014, Brismar owner of Green Strategy, a consultancy firm in Stockholm Sweden and fashion house H&M on different occasions, introduced the word Circular Fashion to the fashion industry. This term is the fusion of circular economy and sustainable fashion to minimize and eliminate too much waste in the fashion industry (Green Strategy, 2019).

Brismar (2014) defined Circular fashion as clothes, shoes and accessories that are designed, sourced, produced and provided with the intention to be used and circulate

responsibly and effectively in society for as long as possible in their most valuable form and hereafter return safely to the biosphere when no longer of human use.

Circular economy concept recognizes the importance of the economy needing to work effectively at all scales hence as fashion schools or industries, there is a need to support this through an introduction of new design practices which aims at maximizing longevity and durability of a product. Turning garbage into resources for poverty alleviation in emerging nations

The concept of a circular economy is even more appealing. According to McKinsey's analysis, as stated by Perella (2014), transitioning to a circular economy, which aspires to eliminate waste by 2050, will save the world \$1 trillion by converting it into resources. The world economy may gain one trillion dollars by 2025 and within five years, 100,000 new employments will be created. Because emerging countries are so vulnerable, there is an urgent need to tap into the waste as an agenda to promote development of resources.



2.5 Sustainable Fashion

Sustainability is commonly characterized as providing current demands while not jeopardizing future generations' requirements (World Commission on Environment and Development-Brundtland Report, 1987). This widely accepted description is intended to help people understand what sustainability is and what its objectives are. Sustainable consumption, according to the Oslo Round Table on Sustainable Production and Consumption (1994), is an umbrella term that encompasses meeting needs, improving quality of life, increasing the use of renewable energy sources, minimizing waste, and considering the entire product lifecycle.

Academics have spent a lot of time looking into the sustainability of product design and development. More understanding about extending product lifecycles is needed in the apparel business to enable sustainable development (Niinimäki & Koskinen, 2011). Sustainability is currently being viewed through a more holistic and global perspective, according to Prothero, McDonagh, and Dobscha (2010), affecting the items people wish to buy. Many sustainable product design models have been offered, including Design for Sustainability (DfS), which aims to incorporate sustainability into design by considering social, economic, and institutional considerations into goods (Spagenberg, Fuad-Luke, & Blincoe, 2010).

2.6 Paper and Fabric Upcycling and Recycling

In the current day, recycling is an important method of waste management; it is the process of converting waste materials into new or environmentally friendly manufactured commodities (Agrawal et al., 2013). Fabrics are also recyclable in 99 percent of cases, according to the company. Although the zero-waste method involves flat pattern production, the upcycle process uses discarded clothing, paper, and flat fabric, according to Sinha (2016). Fabric recycling, according to Sandin and Petters (2018), is the reprocessing of pre- or post-consumer fabric or textile waste for use in new textile and same applies to paper waste; upcycling, or textile reuse, is a variety of methods for extending the useful life of textile products by transferring them to new owners with or without modification. Clothing and fabrics, on the other hand, can be up-cycled into rags, low-grade blankets, and upholstery (Schmidt et al., 2016).

Having stated that, if the fabric waste product is of high quality, upcycling is said to be more useful than recycling because it requires less energy and does not rely on new materials for its conclusion (Gardetti & Torress, 2013). This is because upcycling

involves transferring old items to a new user or refashioning them for a new function. In a nutshell, no new fabrics or resources are used to create new products. According to Gardetti and Torress (2013), other recycling types, aside from upcycling fabric waste, require a lot of energy to break down recycling products. They further claim that consumers think recycled goods are of inferior quality since some companies use recycled materials to make lower-grade products known as downcycles. As a result, the quality of upcycling and recycling products made from fabric wastes would need to be considered.

2.7 Reducing Paper and Fabric Waste and its Benefits

There are several ways to reduce paper and fabric waste in the fashion business and in schools, as well as to keep it out of dumpsites or landfills. Large-scale garment factories, small-scale garment factories, merchants, individuals at home, and fashion colleges can all do and achieve this. According to Walter et al., (2019), post- and pre-consumer fabrics could be used as feedstock throughout the fiber production process for stuffing goods like pillows. They go on to say that textiles are mechanically recycled through procedures that cut and shred materials into fibers, which are then spun into yarn and transformed into non-woven fabrics.

Both post-consumer and pre-consumer textile wastes can be mechanically recycled into microscopic fiber that can be utilized for yarn and fabric manufacture for a variety of purposes, according to Bartlett et al., (2013). Shorter fibers, on the other hand, may result in lower-quality fabrics, so it's best to mix and match. Reusing and recycling paper and fabric waste has numerous benefits for fashion schools and businesses. Fabric waste in landfills is well known to have numerous negative consequences for both humans and the environment. Fabric recycling, according to Cuc and Vidovic (2014),

offers work for people. Recycling consumes less energy than manufacturing new products. People who turn waste in to creative artefacts may earn money, therefore recycling can be financially lucrative.

Mers (2020) suggested that recycling fabric waste is critical for the fashion business (used clothes or fabric scraps). According to Walter et al., (2019), it is beneficial to provide examples and illustrations of approved industry practices, as well as to consider the benefits of fabric recycling and reuse. They go on to say that in countries like Brazil, Finland, Sweden, and Denmark, there are significant businesses and developments that show how fabric can be reused/recycled for economic and social purposes, encouraging customers, merchants, and workers while adding value to society, such as H&M collecting old clothes for recycling and reuse.

2.8 From Waste to Income Generation

The amount and volume of waste produced by countries has tended to differ from country to country, and even within countries, from area to region. Educational institutions ca not also be left out.

Developing countries have a higher poverty rate than developed countries. The growing scarcity of resources, on the other hand, has resulted in an increase in the demand for recycled products over time (Rozenberg, 2013). In some cases, waste used to be viewed as a serious burden for governments two to three decades ago, but it is no longer. Through the efforts of enterprises like Chandaria Paper, which recycles 8% of waste paper and employs around 1100 people, Kenya is able to recycle 15% of its overall paper waste. In addition, Madhu paper recycles roughly 7% of waste paper (Karanja, 2005). Pan Africa Paper is the main paper marketer in Kenya, selling roughly 60% of recycled paper in the Kenyan market thanks to its recycling activities (Kasozi, 2009).

In recent years, as technology has advanced, waste has become a more valuable resource.

According to Chalmin and Gaillochet (2009), waste can provide significant economic benefits to a country's development provided its recycling regulations are streamlined. According to a paper examining the economic effects of recycling in the EU countries. In 2004, they were able to generate EUR 32 billion through recycling, which climbed by over 100% to a minimum of EUR 60 billion in 2008. (EEA, 2011).

Similarly, employment creation in the recycling industry grew from 7% per year to a 45 percent from 2000 to 2008. As a result, recycling has created more occupations at higher salary levels in waste management.

2.9 Fabric Craft Works

The origin of wall hangings can be traced back to a civilized man's desire to decorate his home's walls beyond utilitarian requirements. Its evolution is strongly linked to the development of civilization in many ways. Although just a few of the past textile achievements are directly relevant to wall hanging designs, many of the primitive man's fabric arts have contributed techniques that are the foundation for all contemporary expression to today's artist-craftsman (Van, 1962).

Fabric is easily transportable and can help us connect to places we may not be able to return again. Fabric use pattern and design, elaboration and adornment, color, and the wearing of distinctive clothing and dress to connect us to group identities (Gordon, 2011). Craft has been a vehicle to think about self-sufficiency, self-empowerment, community experience, and satisfaction in labor, as well as a means for battling poverty and oppression (Burcikova, 2011).

Fabric art is a medium for freedom and creative experimentation, as well as a wall decoration or natural aesthetic aspect of the room. Fabric art will inevitably be emphasized not only by the textile industry, but also by artists such as painters, sculptors, philosophers, and other artists. Fashion designers have begun to experiment with and develop fabric media and techniques in order to establish their work (Rizali, 2018).

Wang et. al., (2012) asserted that fabric art is also a type of creative expression. Fabric is the primary medium used by artists to create their works of art. It is a comprehensive covering technique for many types of handcrafted items. Fabric art is created through an artistic technique to satisfy the needs of people in their everyday lives. As a result, it has both aesthetic and psychological significance.

2.10 Paper Crafts Work

The art of paper crafting began with the origins of paper. Paper is a thin, unwoven material produced mostly of milled plant fibers that is used for writing, artwork etc. (Tinker, 2018). Tinker (2018) asserted that papercraft is an umbrella term for a variety of art forms that use paper as the principal medium for creating three-dimensional things. In the arts and crafts world, it is the most extensively used material. Paper can be folded, sliced, glued, molded, stitched, or stacked, for example, and it lends itself to a wide range of techniques. Hand papermaking is another major paper craft. Paper craft is an economical medium for producing work by hand in a world of machine-made goods. Many people yearn to create and acquire handcrafted items in order to add beauty to their lives. It all comes back to the definition of a craft, which is the creation of something new, an item that is done with one's hands (Tinker, 2018)

Paper crafting is a simple, pleasant activity that may add a touch of whimsy to one's life. It can divert your attention away from problems for a brief period of time, provide a sense of productivity and accomplishment, and encourage creativity. Recycling materials such as paper and fabric scraps as craft products is not only environmentally friendly, but it is also a cost-effective way to save money by transforming readily available resources into appealing items (Tinker, 2018).

Pattern paper wastes can hence be used as a major resource or material for paper craft works. These papers can be cut painted, glued, folded in the form of origami, collage depending on the art image in the mind of an individual.

Moses (2020) gave a number of benefits of paper crafts for adults. Paper crafting, like other hands-on activities, activates numerous areas of the brain at once and aids in the formation of new neural pathways, according to studies. Most paper crafts have a step-by-step approach that involves mental discipline and promotes decisive thinking. It helps boost self-confidence as well, there are always many tasks on a regular basis to be done, but only a small percentage of them result in a physical, tangible thing. The creative brain is made in a way that, until a product has been successfully made, there is actually no goal achieved. Hence the joy of going through the processes of art, seeing and touching the work gives so much confidence to an individual.

2.11 Wall Hangings

Wall hangings have been created for ages in almost every corner of the world for a number of reasons other than mere decoration.

The Bayeux Tapestries showing scenes from the Norman Conquest are examples of early wall-hangings that were tapestries into which complete stories were sewn. During

the Middle Ages, wall-hangings were used to cover the walls of big drafty dwellings to help retain some of the heat, and woolen hangings were frequently connected to iron rods to act as room dividers. Huge amounts of tapestries and hangings were displayed by kings and notable persons, according to inventories gathered from Henry VIII's palaces (Konner, 1976).

It is a widespread human practice to hang hangings made of various materials on interior home walls for the purpose of decorating. Wall hangings constructed of netting or curtain material are sometimes used by home owners in rural Africa to decorate their walls (Ngufor et al, 2014).

Many well-known painters, including Rubens, Boucher and later Gaugin, Picasso, Matisse, and Miro, had their designs copied as wall hangings after discovering the possibility of converting their works from canvas to cloth.

2.12 Types of Wall Hangings

A wall hanging is a decorative object that is hung on a wall, usually composed of cloth. It's similar to a painting and should be made with design concepts in mind. Anyone with an idea they want to convey and share can make a wall hanging. Embroidering, appliqueing, batiking, printing, paper mache are all methods for making wall hangings (Habel, 1976).

2.12.1 Embroidery and Applique Design

According to Habel (1976), this fabric designs can be made out of a variety of materials. Different shapes of designs can be cut of fabrics and it can be sewn or pasted to the background of another fabric piece, preferably a plain fabric. The use of embroidered

design stitches will last longer than one that is pasted. Use a needle with a large eye for stitching with yarn.

2.12.2 Batik and Print Design

Batik fabric wall hanging is a type of batik that is used to decorate walls. Batik is well-known in the apparel industry. However, with the development of Batik, it may now be utilized for a variety of purposes. Walls decorating is one of them (Larasti, 2018). Powell (1976) describes this type of design as various cut outs of well-designed batiks in different shapes, framed and used as wall hanging to beautify walls of rooms.

Batik has a distinct function when it comes to wall decoration. The pattern reveals the distinctions. Furthermore, the type of material used is varied. The pattern on the Batik wall hanging depicts a distinct image of a people, animal, and other objects. Those patterns were used to create a unique setting in each space (Larasati, 2018).

2.12.3 Painting with Wax Design

It is both difficult and satisfying to paint with wax. All that is required is a few simple materials and a vivid imagination in order to create an intriguing conversation piece as well as exquisite artwork.

Material that can be used will be discarded crayons or candles, and the applicator will be an old paint brush. The painting design should first be drawn onto a piece of wood, ideally fiberboard, as wax adheres nicely to this material. Before applying the wax, the artist may choose to wood burn his design (Powell, 1976).

Different colors of wax are melted independently in ancient saucepans or a muffin pan, the melted wax is then applied to the board with a brush, much like when using paint as a medium. The task must be completed quickly; any color that is used frequently may need to be re-melted numerous times due to the wax's rapid hardening. Wax can

be used to create textures in the same way that paint can, by changing the thickness and smoothness with which the wax is applied.

Acrylics or thick watercolors can be used to paint over the wax if desired. This is especially useful if a certain shade of wax is not available; simply choose a neutral color and paint it once it has solidified. Wax painting requires time and patience, but the artist's efforts are well worth it. The end product is a one-of-a-kind creation that has sparked a lot of interest and appreciation. (Powell, 1976).

2.12.4 Paper Mâché Wall Hanging

The term "papier-mâché" has been given to a variety of three-dimensional creations with a paper core. The term may be perplexing. It is spelt in a variety of ways, from the French papier-mâché to Anglicized paper mache, papier machie, and so on (Brachert, 1979). The phrase "papier-mâché" originally meant "masticated paper," but it is now used to denote a wide range of artifacts constructed from many sorts of paper constructions. Brachert (1979) mentions that paper mache can be used for wall hanging of different shapes and sizes with painting added to beautify it.

2.13 Summary

There have been varied investigations on circular economy and most of these have been discussed under topics like solid waste management, sustainable waste management strategies in the fashion industry sector and many more. Researchers have made it known that there is equally a need to look within the fashion industry which also produces a lot of waste during the garment production processes. A lot of activities go on within the garment production area which brings out waste; the drafting processes, the cutting out processes and the stitching processes.

A circular economy approach to fashion strives to create a more sustainable and closed-loop system, with the goal of extending garment use time and preserving the value of products and materials for as long as feasible. This means that all of the materials will be recycled multiple times. Products are created to be part of a system in which all aspects contribute to circularity. Several lifecycles must be considered in the initial design. Paper and fabric waste generated during these moments can be used again rather than just disposing them off. This chapter delved into the various research works done by scholars who mentioned various approaches which could be used to make use of these paper and fabric wastes created during production.



CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter describes the research methods used in the collection of data for the study. Research methodology, according to Collins and Hussy (2003), is the total approach to the design process, from theory to data collecting and analysis. The methodology interrogates the ways the institutions in the research area deal with their fabric and paper waste; and their understanding of circular economy. Furthermore, what do these schools do with their fabric and paper waste? Is it part of their culture to appreciate and recycle these wastes? The objective is to explore whether or not these selected schools utilise their fabric and paper waste. This chapter includes research design, population of the study, sample size and sampling techniques, data collection instruments, data collection procedure and data analysis. The main rationale of this chapter is to offer a clear description of the processes of the research.

3.2 Research Area

Fashion schools in Accra are categorized into two groups depending on how designs and making are approached; those that teach free-hand cutting and those that teach flat pattern drafting. Out of about ten fashion institutions within the Ga East Municipality in the Greater Accra Region that teach flat pattern drafting, three fashion institutions, namely Joyce Ababio College of Creative Design (JACCD), Miklyn Innovative Fashion School and Catechist Georgina Korankyewaa Fashion Schools were chosen because of the amount of paper waste created due to their pattern works, easy accessibility and convenience to the school were reasons for the choice of schools by the researcher.

The Ga East Municipal Assembly (GEMA) is one of the Greater Accra region's 29 districts. After the passage of the Legislative Instrument (LI) 2036 in 2004, it was founded. It was a component of the Ga District Assembly in 1988. The district is situated in the northern section of the Greater Accra Region and encompasses an area of approximately 85 square kilometers.

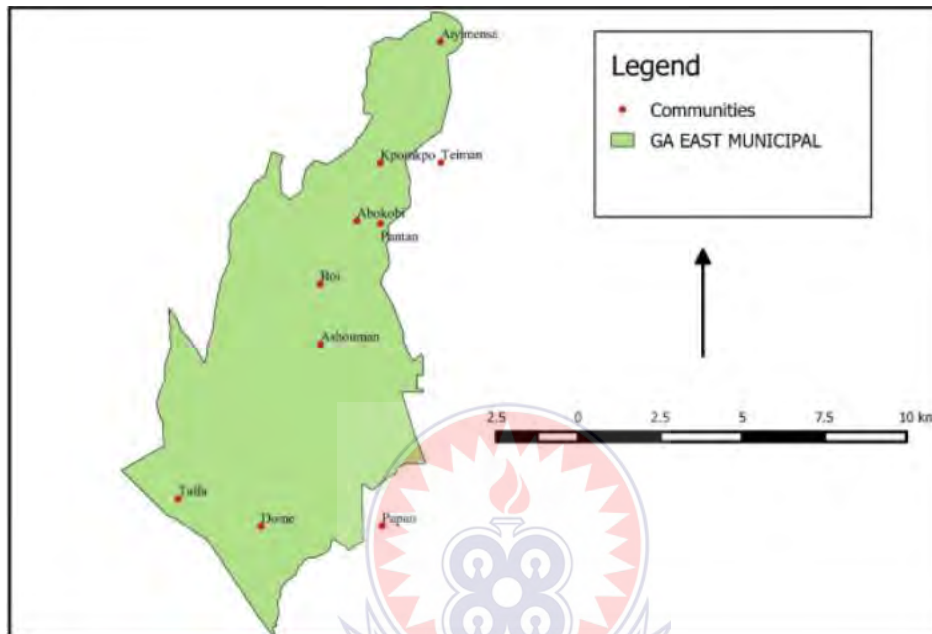


Figure 3.1: Map of Ga East Municipality (Source: gemanewsgh.wordpress.com, 2022)

3.3 Research Design

The research design is the bond that keeps the project together. A research design is used to organize the study and answer the research questions (Trochim, 2006). A case study approach was used for this study which was practiced based and had a mixed method approach (quantitative and qualitative research approach) which was used to determine the understanding of circular economy, as well as the handling of paper and fabric waste within the research area.

Creswell (2013) asserts that mixed methods research is a prominent methodology in the social, behavioral, and health sciences in which researchers collect, evaluate, and

integrate both quantitative and qualitative data in a single study or across time to answer their research objectives. Best and Khan (1989), quantitative research is based more directly on its original plan, and its results are more easily examined and interpreted.

Bryman (2006), the rationale of combining qualitative and quantitative research is to offset weaknesses of both methods and draw the strength of both. It is also for completeness which refers to the notion that the researcher can bring together a more comprehensive account of the area of enquiry in which he or she is interested if both quantitative and qualitative research is employed. Moreover, it enhances credibility, in that, suggestions that employ both approaches enhances the integrity of findings.

3.4 Population of the Study

According to Gravetter and Forzano (2009), population refers to the total group of people who are of interest to a researcher. Although a research study normally does not involve the entire population, the findings are projected to the entire community. The target population of this study comprised of fashion students and staffs (teachers, administrators, cleaners) of three selected fashion institutions totaling 120 participants.

3.5 Sampling Technique and Size

Purposive sampling technique was used to collect data for this study. Purposive sampling, according to Castillo (2009), is utilized when only a small number of people have the features that the researcher is looking for. Purposive sampling can also be used if the researcher recognizes a trustworthy specialist or authority who can put together a representative sample. The sample institutions include Joyce Ababio College of Creative Design (JACCD), Miklyn Innovative Fashion School and Catechist Georgina Korankyewaa Fashion School. In total 90 respondents were used from fashion design

students and staffs (administrators, teachers, cleaners, teaching assistants) of the institutions with the help of Krejcie & Morgan (1970) population and sample table on their views on paper and fabric waste managements in their institutions. Seventy responses from students and 20 responses from staffs. This included 40 students and 10 staffs from Joyce Ababio College of Creative Design, 15 students and 5 staffs from Miklyn Innovatives Fashion School and 15 students and 5 staffs from Catechist Georgina Korankyewaa Fashion School. Closed-ended questionnaires were given to the respondents and the researcher retrieved all questionnaires. The heads of the three institutions were also interviewed.

3.6 Data Collection Instrument

Questionnaires and observation were used as research tools for the students and interview for the staffs in this study. Questionnaires were chosen because they were easier to administer to respondents and was less expensive. This was done to seek for the opinions and knowledge of respondents on how to reduce fabric and paper waste in the garment production process (Bryman, 2012).

3.7 Data Analysis

In the study, Statistical Package for Social Scientist (SPSS) was used to transform the data. The tools of SPSS which were employed for the analysis included descriptive statistics involving measures of central tendency such as percentage, frequencies, bar and pie charts. Thematic analyses were also used.

3.8 Summary

This chapter gave a clear description of the research area, the population, the sampling technique and size, as well as the data collection instrument and the data analysis process. Three fashion institutions, namely Joyce Ababio College of Creative Design (JACCD), Miklyn Innovative Fashion School and Catechist Georgina Korankyewaa Fashion Schools were chosen for this research out of about ten schools within the Ga East Municipality that uses body measurements to draft patterns.

A case study approach was used for this study which was practiced based and had a mixed method approach (quantitative and qualitative research approach) which was used to determine the understanding of circular economy, as well as the handling of paper and fabric waste within the research area.

The target population of this study comprised of fashion students and staffs (teachers, administrators, cleaners) of three selected fashion institutions totaling 120 participants. Purposive sampling technique was used to collect data for this study. In total 90 respondents were used from fashion design students and staffs (administrators, teachers, cleaners, teaching assistants) on their views on paper and fabric waste managements in their institutions. Seventy responses from students and 20 responses from staff.

Questionnaires, interviews and observation were used as research tools in this study. Statistical Package for Social Scientist (SPSS) and thematic analyses were used to transform the data.

CHAPTER FOUR

RESULTS PRESENTATION

4.1 Introduction

This chapter seeks to present the results of the data gathered during the field studies conducted during this research. It seeks to answer the research questions and the objectives presented in the chapter one of this study. It also presents the processes of the practical work to be presented. It shows the analyses of data collected and the findings of the study for further discussion as a basis for minimizing paper and fabric waste.

This part of the study was organized in two parts. The first part discusses the findings of the quantitative research from the students and staffs' perspective. This discussion includes how research participants manage paper and fabric waste after production process, knowledge of circular economy and ideas on how to create items from paper and fabric scraps. Second part entails how the researcher used insight from the questionnaire and interview to develop creative wall hanging crafts work designs using paper and fabric scraps. Results are divided into two sections, that of students and staffs.

4.2 Analysis of Student's Responses

Below is the analysis of data retrieved from the fashion students.

4.2.1 Representation of Students Schools

Out of a total of 70 respondents of students, 40 representing a majority of the respondents (57.14%) were from Joyce Ababio College of Creative Design. This was followed by Miklyn Innovatives Fashion which had 15 respondents representing 21.43% and lastly Catechist Georgina Korankyewaa Fashion School with 15 respondents representing 21.43%.

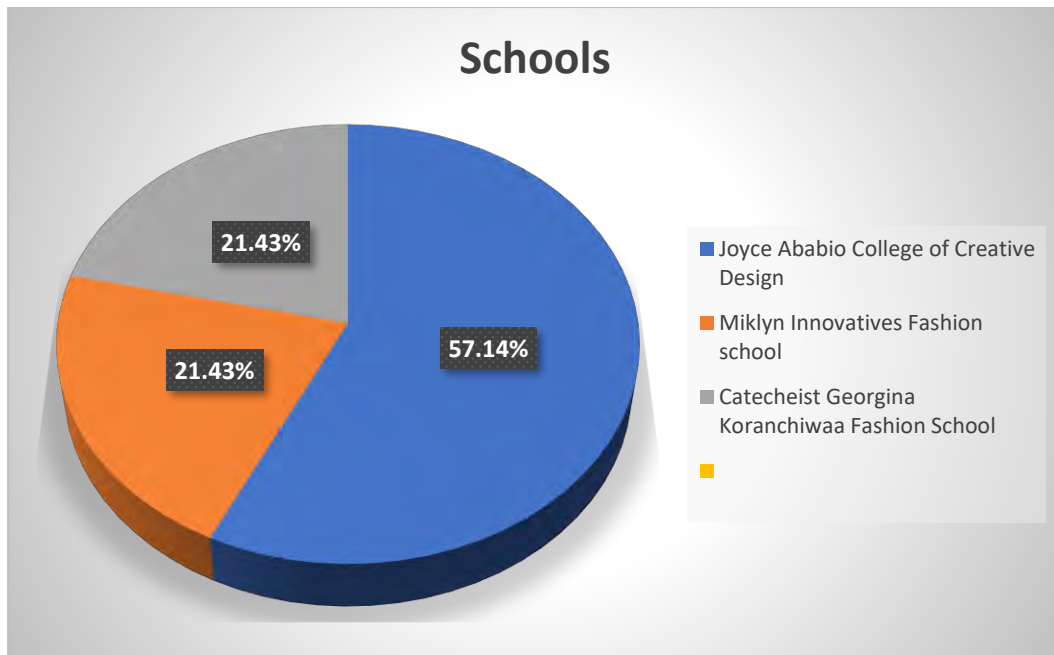


Figure 4.1: Student Respondent's Institutions
Source: Field Data (2021)

4.2.2 Gender of Students

The study revealed that majority (70%) of the respondents were female while the rest (30%) were males. This indicates that there are more females studying the fashion and design programmes in most institutions.

Table 4.1: Gender of Students Respondents

	Number of Respondents	Percentage (%)
Female	49	70
Male	21	30
Total	70	100.0

n=70, Source: Field Data (2021)

4.2.3 Age Range of Students Respondents

The study revealed that more than half (51.43%) of the respondents' age fell within the age range of 15 to 25 years, while 30% fell between 26 and 36 years and 18.57% were within the age range of 37 or above. This indicated that most young adults were much interested in the fashion programme.

Table 4.2: Age Range of Students Respondents

Age Range	Frequency (n)	Percentage (%)
15 – 25	36	51.43
26 -36	21	30
37 or above	13	18.57
Total	70	100.0

n=70, Source: Field Data (2021)

4.2.4 Educational Level of Students

Majority of the respondents (50%) attended tertiary before enrolling in the fashion school. The study also revealed that 30% completed Senior High School (SHS) before enrolling in fashion school, 15.71% had only Junior High School (JHS) background. While 4.29% had certificates in other backgrounds other than what had been stated previously.

Table 4.3: Educational Level of Students Respondents

Educational level	Frequency (n)	Percentage (%)
JHS	11	15.71
SHS	21	30.00
Tertiary	35	50.00
Others	3	4.29
Total	70	100

n=70, Source: Field Data (2021)

4.2.5 Paper and Fabric Scrap Management Practices by Some Selected Fashion Schools in Accra

The data results revealed that majority (64%) of students manage their paper and fabric scrap waste by disposing them off in a dustbin. 22% actually burns the scraps while only 14% use the scraps to create something again. This actually identifies the need to intensify education on circular economy in paper and fabric waste management.

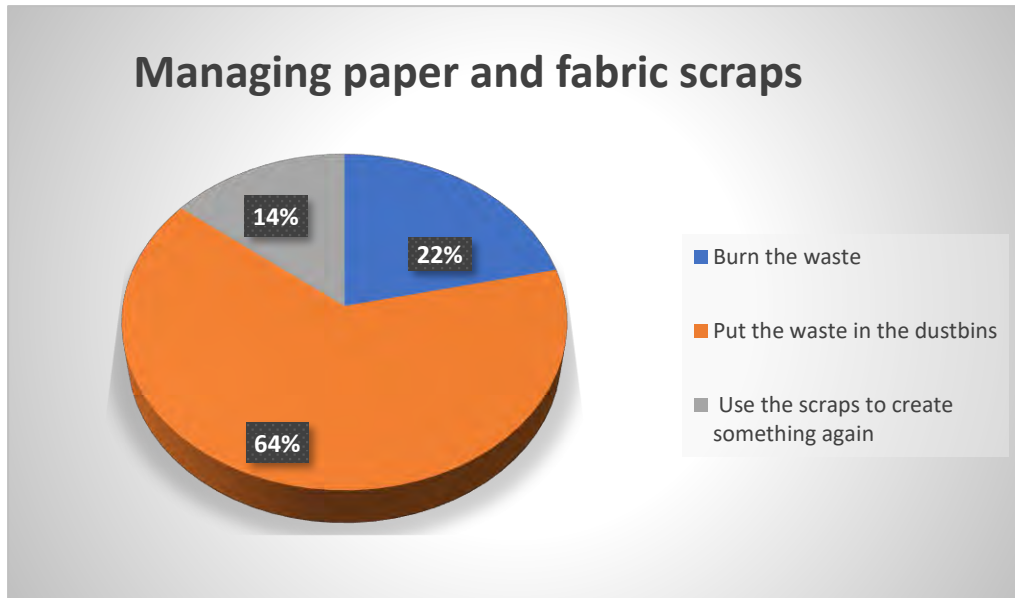


Figure 4.2: How students manage paper and fabric scraps
Source: Field Data (2021)

4.2.6 The Knowledge of Circular Economy by Students

The data received indicated that majority (65%) had not heard or come across the term circular economy, while 35% indicated they had heard and read on the term circular economy.

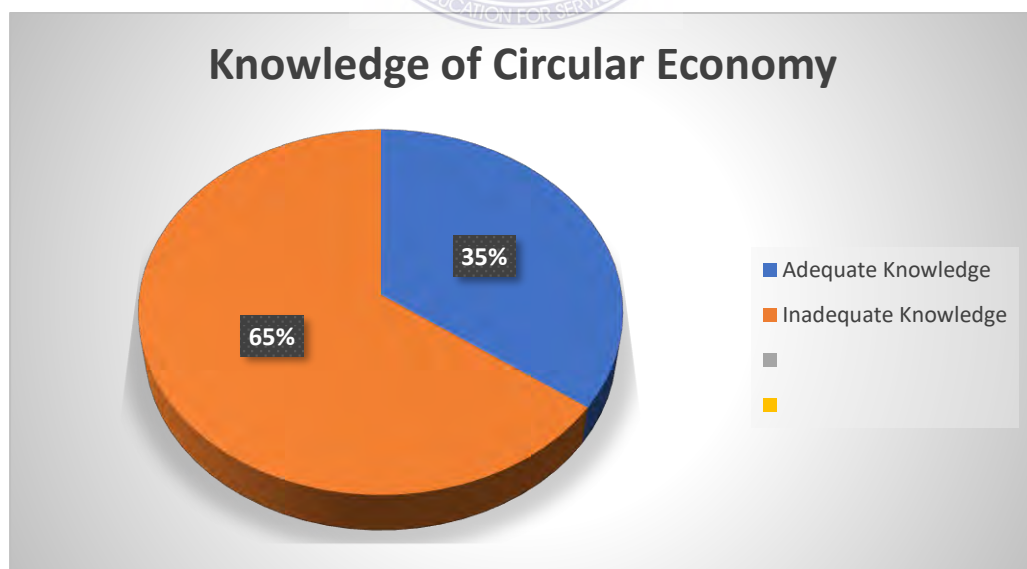


Figure 4.3: The knowledge of Circular Economy by Students
Source: Field Data (2021)

4.2.7 The Association Between Practice of Paper and Fabric Waste Management and Student Socio- Demographic Characteristics

The data identified that majority of students from JACCD used their scraps to create something new, CGAFS students mostly dispose of their scraps in the bin while Miklyn Fashion School had majority of students burning their scraps.

Table 4.4: How paper and fabric scraps are managed (schools)

Variable	Frequency N=70 (percentage %)			p-value	X ²
Institution	Burn the waste	Put the waste in the dustbin	Use the scraps to create something again		
JACCD	5 (33.33)	0 (0.00)	10 (100.00)	0.001	6.370
CGAFS	0 (0.00)	40 (88.89)	0 (0.00)		
Miklyn	10 (66.67)	5 (11.11)	0 (0.00)		

N=70, Source: Field Data (2021)

4.2.8 Practical Ways to Use Paper and Fabric Scraps

It can be deduced that out of 70 respondents, 64.3% representing the majority taught of using paper and fabric scraps to create a new garment. 18.6% indicated they will use the scraps for fashion accessories like hair ribbon, necklace, bracelet, earrings while 14.3% suggested the scraps could be used for either a fabric artwork or a paper artwork. 2.8% had no idea of what to use the paper and fabric scraps for. This sure reveal that most fashion students are yet to explore other ways of making use of mostly fabric scraps other than using it to sew a new garment.

Table 4.5: Practical ways of making use of paper and fabric scraps

Uses	Frequency (n)	Percentage(%)
Paper/Fabric Artworks	10	14.3
New garments	45	64.3
Fashion accessories	13	18.6
No idea	2	2.8
Total	70	100

n=70, Source: Field Data (2021)

4.3 Analysis of Staff Responses

Below is the analysis of data retrieved from the staffs of the institutions

4.3.1 Representation of School Staff

Out of a total of 20 respondents of staffs, 10 representing a majority of the respondents (50%) were from Joyce Ababio College of Creative Design. This was followed by Miklyn Innovatives Fashion which had 5 respondents representing 25% and lastly Catechist Georgina Korankyewaa Fashion School with 5 respondents representing 25%.

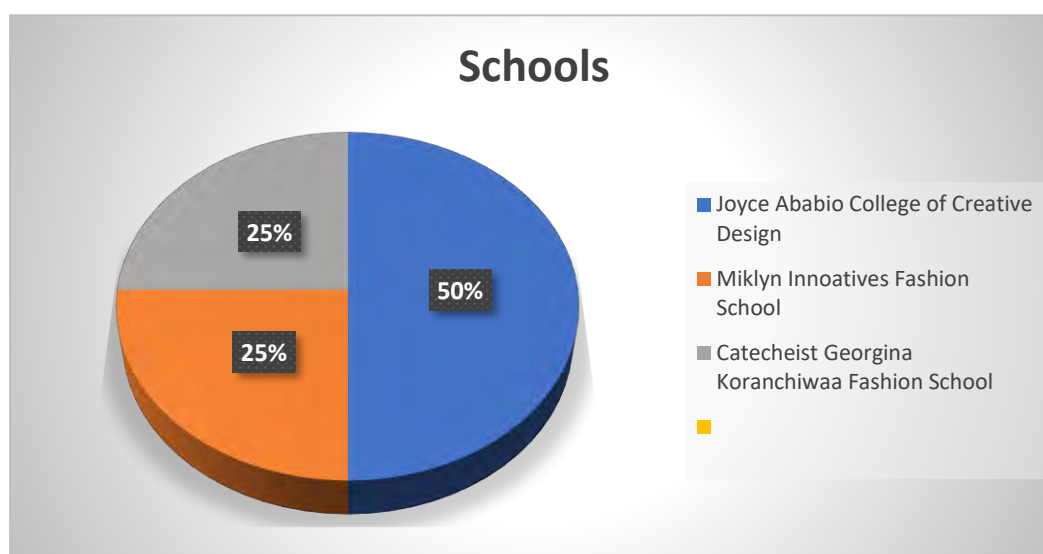


Figure 4.4: Staffs of institutions.
Source: Field Data (2021)

4.3.2 Gender of Staffs

The study revealed that majority (70%) of the respondents were female while the rest (30%) were males. This also indicates that there are more females working as staffs in most fashion institutions.

Table 4.6: Gender of Staff Respondents

	Number of Respondents	Percentage (%)
Female	14	70
Male	6	30
Total	20	100.0

n=20, Source: Field Data (2021)

4.3.3 Age Range of Staff Respondents

Majority (70%) of the respondents' age fell within the age range of 25 to 35 years, while 25% fell between 36 and 46 years and 5% were within the age range of 47 or above.

Table 4.7: Age Range of Respondents

Age Range	Frequency (n)	Percentage (%)
25 – 35	14	70
36 -46	5	25
47 and above	1	5
Total	20	100.0

n=20, Source: Field Data (2021)

4.3.4 Educational Level of Staffs

Staff respondents had 12 people, representing 60% holding 1st degree certificates. 3 respondents (15%) had 2nd degree certificates, 2 respondents (10%) of the respondents having PHD and the last 3 respondents (15%) holding certificates in other fields (A 'level, O'level, SHS).

Table 4.8: Educational Level of Respondents

Educational level	Frequency (n)	Percentage (%)
1 st Degree	12	60
2 nd Degree	3	15
PHD	2	10
Others	3	15
Total	20	100

n=20, Source: Field Data (2021)

4.3.5 Staff Position

The study had teachers as the majority respondents, 12 teachers representing 60%, 5 administrators (3 heads, 2 office managers) representing 25% and 3 other staffs (2 cleaners, 1 librarian) representing 15% took part in the data collection process.

Table 4.9: Staff position of Respondents

Position	Frequency (n)	Percentage (%)
Administrators	5	25
Teachers	12	60
Other Staffs	3	25
Total	20	100.0

n=20, Source: Field Data (2021)

4.3.6 Paper and Fabric Waste Management Practices by Staff

Majority (65%) of staffs revealed that paper and fabric scraps produced by students are put in the dustbins, 20% however made it known that students are most often given projects to make use of the scraps, while 15% indicated the scraps were burnt. This still reveals that the education on re-using of scraps to produce other items needs to be intensified and practiced in these fashion institutions.

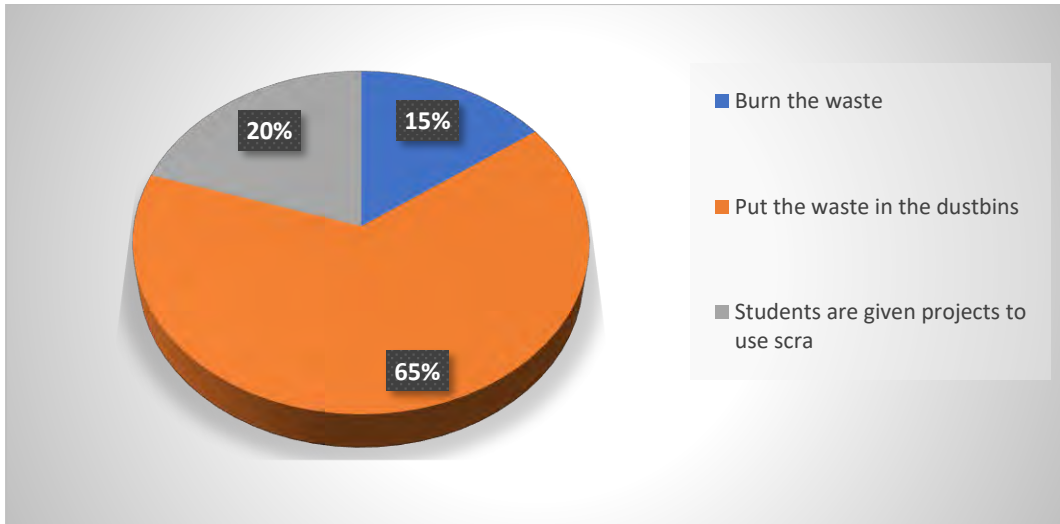


Figure 4.5: Paper and fabric waste management practices in schools.
Source: Field Data (2021)

4.3.7 The Knowledge of Circular Economy by Staffs

The data on knowledge of staff on circular economy came out very impressive, with majority (70%) respondents having adequate knowledge on it. 30% however expressed inadequate knowledge on the topic.

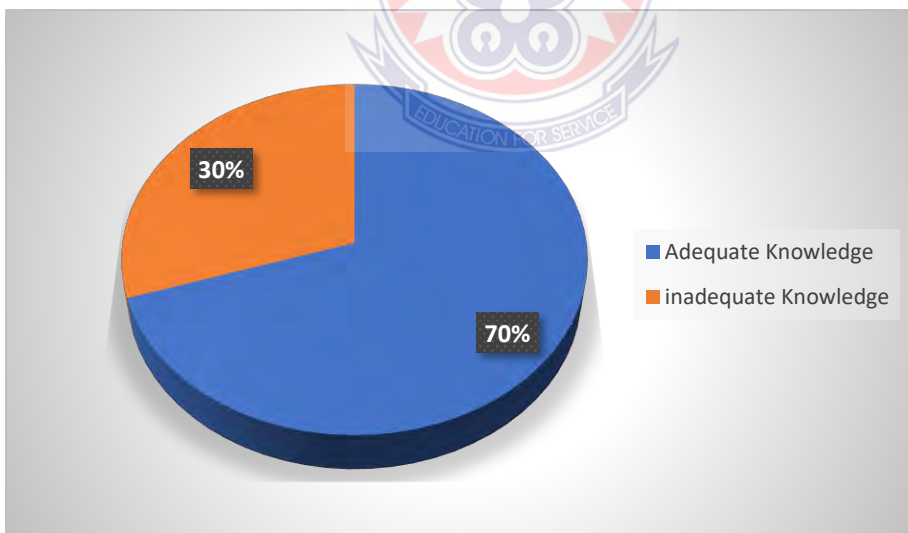


Figure 4.6: Staffs knowledge on Circular Economy
Source: Field Data (2021)

4.3.8 School Staff Ways of Managing Paper and Fabric Waste.

Staff response were torn between disposing off waste in the burn, with majority agree to burning of the paper and fabric waste, while a few supporting the use of the scraps for something new.

Table 4.10: The Association Between Practice of Paper and Fabric Waste Management and Staffs of School's Socio- Demographic Characteristics

Variable	Frequency N=20			p-value	X ²
	Burn the waste	Put the waste in the dustbin	Use the scraps to create something again		
Institution					
CGAFS	1	4	0	0.001	4.820
JACCD	0	0	10		
Miklyn	2	3	0		
Position					
Administrator	0	5	0	0.010	6.334
Other Staff	0	0	3		
Teacher	3	8	1		

N=20, Source: Field Data (2021)

4.4 The Wall Hanging Making Process

This second part is the design process. This is the practical aspect the researcher produced a craft work out of paper and fabric waste to demonstrate how the scraps produced during production can be used rather than just disposing them of or burning them. The approach had to do with using paper and fabric waste scraps to design and

create crafts work. The idea most people have on reusing fabric scraps had to do with creating a new garment out of it. But based on the details of the data retrieved from the data collection, the researcher decided to explore a different alternative of using these paper and fabric scrap. The creative use of the scraps to create a wall hanging came to mind.

Out of a lot of scraps created from a number of drafting and garment production processes at home, a few of these scraps were sorted and selected based on the design idea in mind to be used. The texture of fabric was considered, the colour of the fabric pieces were also considered. This was done to ascertain the durability and longevity of the art work to be made. The design process aimed at creating a peacock wall hanging artwork using paper and fabric scrap waste. Since the idea in mind was a peacock design, the researcher was in search of a more colourful fabric with dotted designs on to bring out the detailing of the artwork.

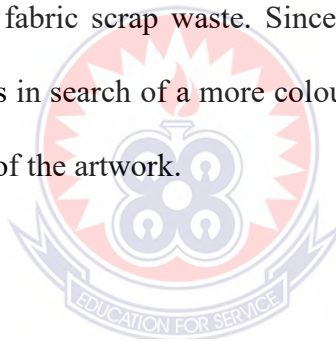




Figure 4.7: Samples of sorted out fabric and paper scraps
Source: Photo by researcher (2021)



Figure 4.8: Samples of selected fabric scraps
Source: Photo by researcher (2021)

Because of the peacock design idea in mind, the researcher decided to use more of the fabric scrap the had bold coloured dots of different colours and sizes since that could easily be cut out and used as the feather designs of the peacock bird. The fabric scraps of that design were all picked out and cleaned since it had been stored with the fabric scrap bag for a long time. It had to be washed, dried and pressed before it was cut out into pieces just as the design in the fabric, pieces of brown papers were also cut out. The cutting out of the design pieces took some time because they were of different small sizes and the researcher needed all those pieces as detailing for the making of the peacock wall hanging.



Figure 4.9: Cut out pieces of selected fabric scrap
Source: Photo by researcher (2021)



Figure 4.10: Disassembled picture frame with black stretch fabric scrap
Source: Photo by researcher (2021)

A picture frame was part of the materials. The researcher wanted a black background colour so the peacock design could be visibly seen within the frame. Hence the frame had to be disassembled for it to be covered with a black stretch fabric scrap. The stretch fabric was selected to allow it to easily go over the wood of the frame. With the help of a pair of scissors, the black stretch fabric was cut out according to the shape and size of the frame. A fabric glue was used to hold the fabric firmly down onto the wooden of the frame. The outer edges of the frame were not fixed yet.

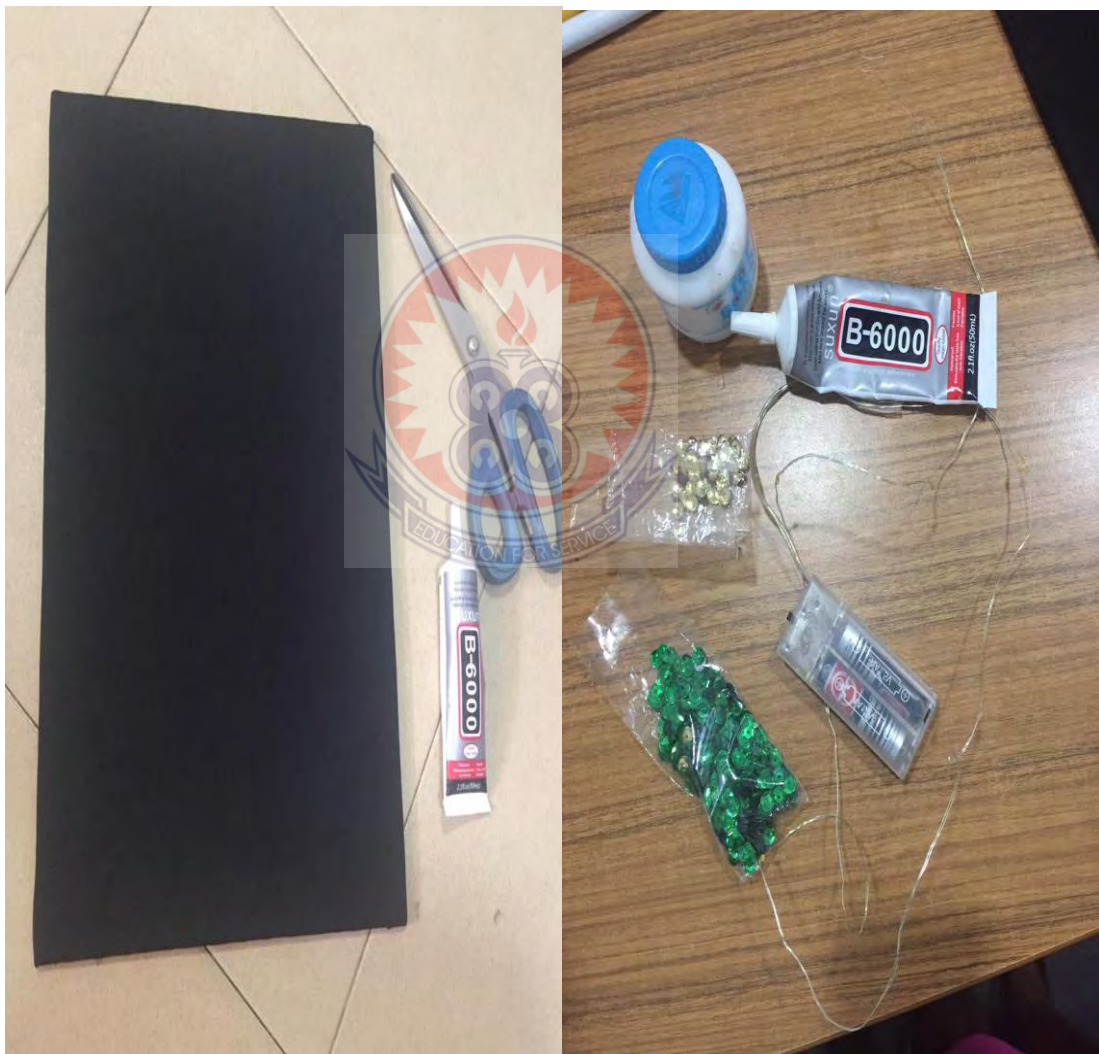


Figure 4.11: Covered picture frame with black fabric scrap and other materials
Source: Photo by researcher (2021)

The outline of the peacock bird was first sketched on a piece of fabric to get it done well, it was cut out and then carefully placed on a different blue fabric scrap to be cut out and used as the bird for the work.



Figure 4.12: Peacock bird sketch on a piece of fabric
Source: Photo by researcher (2021)

The blue bird cut out and oval shaped cut outs from the fabric scraps were all arranged on the black covered frame and pinned down. The arrangement of the colourful dotted oval cut outs were carefully done to depicts how the feathers of the peacock looks like when it is gracefully opened.



Figure 4.13: Arranged cut outs on black background
Source: Photo by researcher (2021)

After the colourful dotted oval cut outs were arranged on the black frame, sequins were added to the work as an embellishment for the creative artwork to come out colorful as the peacock bird looks like.

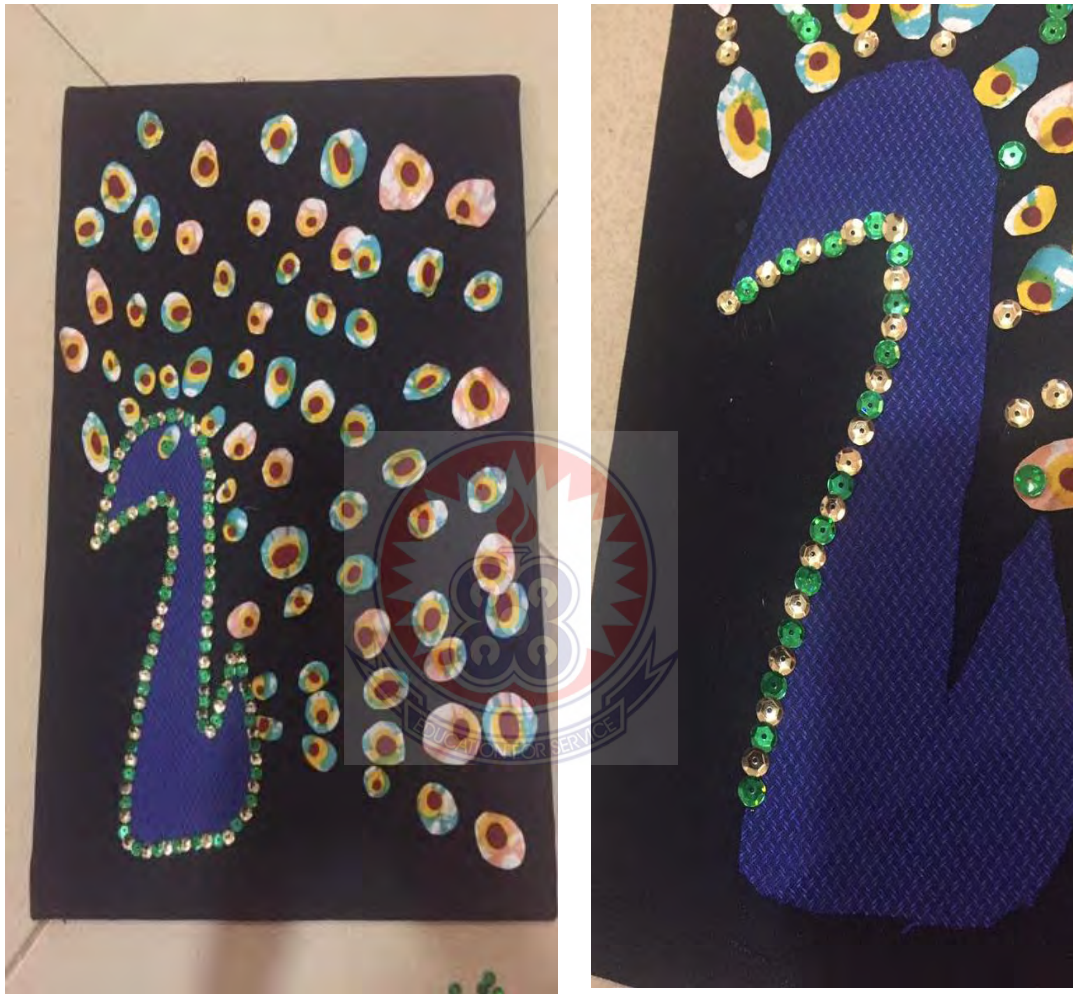


Figure 4.14: Sequins arranged on the artwork.
Source: Photo by researcher (2021)

First progress work can be seen here with the design idea gradually taking shape



Figure 4.15: Progress work 1

Source: Photo by researcher (2021)

Another phase of the wall hanging with paper designs added. There is a trail of light added to the sides of the frame to throw light on it at night. This light here was not well attached to the sides of the frame.



Figure 4.16: Progress work 2

Source: Photo by researcher (2021)

This progress work has the trail of light stability fixed on the frame. This can easily be seen. Measures were taken to try and hide the light lines in the frame.

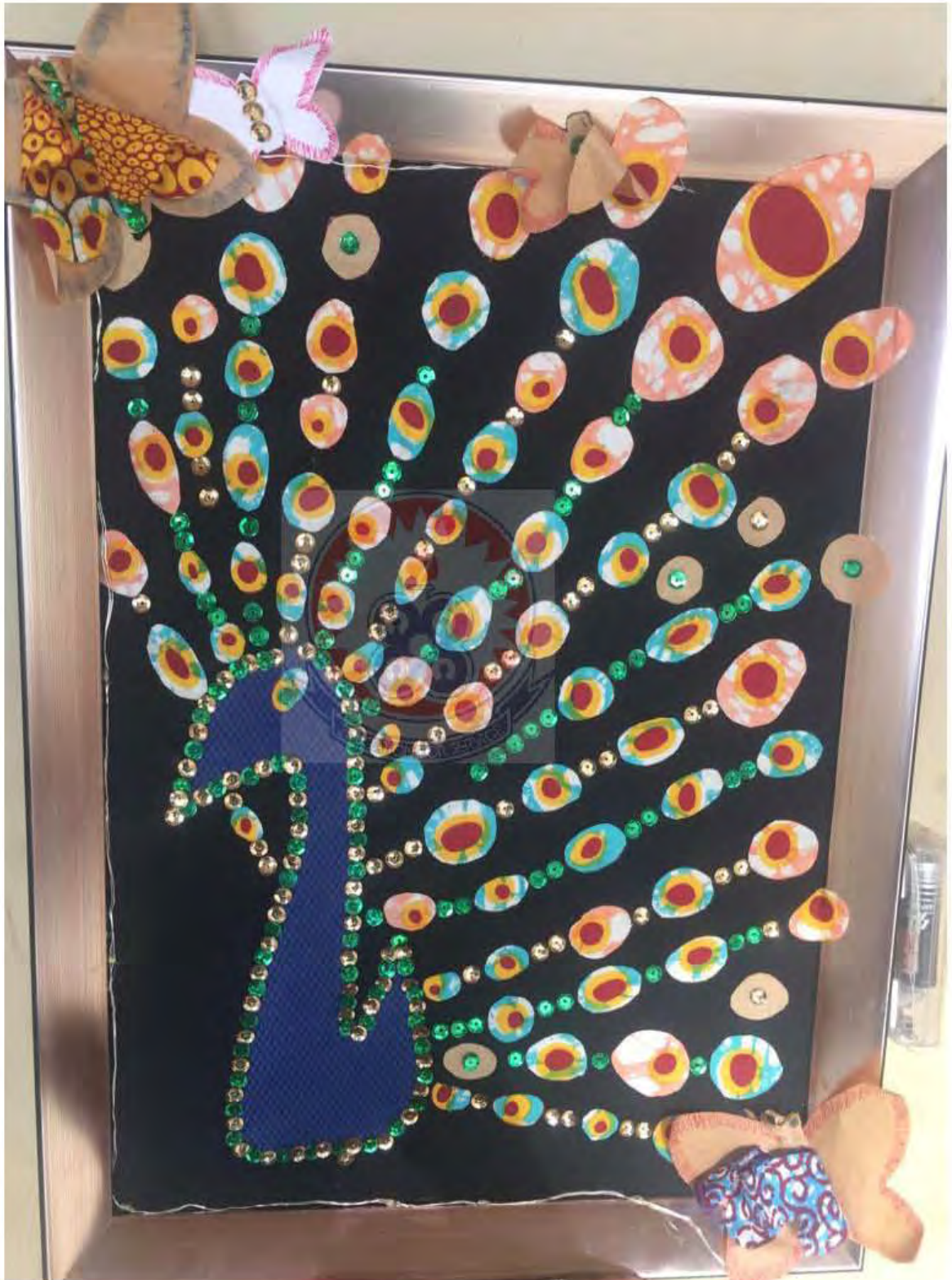


Figure 4.17: Progress work 3
Source: Photo by researcher (2021)

The light lines were finally hidden within the black stretch fabric of the frame. The only visible part is the light itself when it is turned on. The back of the frame has double sided stick tapes to help mount and stick the artwork on the wall.



Figure 4.18: Final lighted wall hanging
Source: Photo by researcher (2021)



Figure 4.19: Back of wall hanging with double sided tape
Source: Photo by researcher (2021)

4.5 Summary

With a total of 70 respondents of students, 40 representing a majority of the respondents (57.14%) were from Joyce Ababio College of Creative Design. This was followed by Miklyn Innovatives Fashion which had 15 respondents representing 21.43% and lastly Catechist Georgina Korankyewaa Fashion School with 15 respondents representing 21.43%.

Out of a total of 20 respondents of school staffs, 10 representing a majority of the respondents (50%) were from Joyce Ababio College of Creative Design. This was followed by Miklyn Innovatives Fashion which had 5 respondents representing 25% and lastly Catechist Georgina Korankyewaa Fashion School with 5 respondents representing 25%.

Information gathered from the interview were analyzed. Based on the response given, the researcher explored a way of making use of paper and fabric scraps produced during drafting and garment production process. Upon different researches on how to make use of paper and fabric scraps, it was finally decided to create crafts work from the scraps produced.

A wall hanging crafts work was designed and produced using paper and fabric scraps waste generated during a garment production process.



CHAPTER FIVE

DISCUSSIONS

5.1 Introduction

This study explores ways to minimize paper and fabric waste in some selected fashion institutions in Accra by using the scraps for marketable crafts works like a wall hanging.

Based on the research questions, we will discuss:

1. How is paper and fabric waste managed within some selected fashion schools in Accra?
2. What is the level of knowledge of circular economy by students and staffs (teachers, administrators, cleaners) in some selected fashion schools in Accra?
3. What paper and fabric art works can be designed and produced?

5.2 Discussion of Findings

Majority of the respondents revealed were 70% for females and 30% for males respectively for both students and staffs. This affirms past research works that suggests that women are more skewed towards design and art courses (Nosek et al, 2002).

Students' respondents between the ages of 25 to 35 years formed the majority (70%), while 25% fell between 36 to 46 years and only 5% between 47 and above. The ages revealed that most young people within the working age still pursues knowledge to add on to what they have already.

Majority (65%) of fashion students had no adequate knowledge on the term Circular Economy, while 35% had adequate knowledge. This data surprised the researcher as fashion is one of the industries that produces a lot of waste in the world, hence fashion students should be reading or researching on such topics. School staffs however had a

lot of respondents (70%) having knowledge on the term Circular Economy, while 30% had not come across it before.

Interestingly, majority (64%) of students threw their scraps produced after garment production into the bin, 22% burnt them and only 14% thought the scraps could be used for something new other than just putting them in the bin or burning them. Kendie (1999) argued that, the recent upsurge in waste disposal problems comes from the fact that attitudes and mindsets of people towards waste and the rating of waste disposal issues in the scheme of official development plans have not been adequately considered. Hence the students may have not considered other ways of managing their scrap waste.

Data from the School staffs also indicated that just a few (20%) institutions were actually encouraging their students in making use of these scraps they produce by giving them projects to create something new out of it. 15% burn the scraps made by students and 65% put them in dustbins as ways of managing the waste created within the institutions.

Students' data revealed that they had practical ideas of making use of these scraps other than just disposing them off. Majority (64.3%) of them suggested using the scraps for new garments, 18.6% suggested fashion accessories while 14.3% suggested paper or fabric artwork and 2.8% had no idea what to use the scraps for. Walter et al. (2019), indicated the importance and benefit to provide examples and illustrations of approved industry practices, as well as to consider the benefits of fabric recycling and reuse.

Majority (65%) of staffs revealed that paper and fabric scraps produced by students are put in the dustbins, 20% however made it known that students are most often given projects to make use of the scraps, while 15% indicated the scraps were burnt. This still

reveals that the education on re-using of scraps to produce other items needs to be intensified and practiced in these fashion institutions.

5.3 Summary

Findings of the research indicated that majority of students and staffs used for the data collection were female. Meaning most of the fashion institutions were dominated by female students as well as female workers. From the student's data analysis, it was noticed that majority of them had no knowledge about circular economy and its theories, which might suggest that these students are not doing that much research works on how to control and manage waste scraps produced by themselves during garment production.

The staff data however was different with majority of them knowing what circular economy was about. Majority of students also suggested that the scraps produced after garment production could be used to create new garments. Just a few had ideas on using the scraps for other items such as fashion accessories like earrings, hair scrunchies and craftworks like wall hangings.

Majority of the school staff members revealed that paper and fabric scraps produced by students were put in the dustbins, some were burnt while the rest were most often given to students as projects to create and produce items out of the scraps. This showed that the education on re-using of scraps to produce other items or artefacts needs to be intensified and practiced in these fashion institutions.

The use of these scraps eventually would be of great benefit to the students as the item could be sold and to school management because it will also minimize the waste created and disposed every time.



CHAPTER SIX

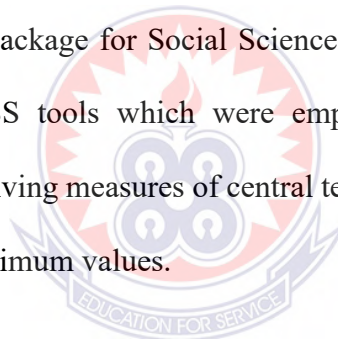
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The study explored ways to minimize paper and fabric waste in some selected fashion institutions in Accra by using the scraps for marketable crafts works like a wall hanging. The purposive sampling was used to sample 90 respondents which includes 70 fashion students and 20 school staff members.

A structured close-ended questionnaire and interview questions were used to collect data for the study. A practical work was also produced using fabric and paper scraps to produce creatively designed wall hangings.

In the study, Statistical Package for Social Sciences (SPSS) was used to analyze the data collected. The SPSS tools which were employed for the analysis included descriptive statistics involving measures of central tendency such as percentage, mode, range, minimum and maximum values.



6.2 Summary of Major Findings

The study revealed that more than half of the respondents were females while the rest were males. 70% for females and 30% for males respectively for students and staffs.

For the students, majority (70%) of respondents fell between the ages of 25 to 35 years, while 25% fell between 36 to 46 years and only 5% between 47 and above. These ages revealed that most young people within the working age still pursue knowledge to add on to what they have already.

It was revealed that majority (65%) of fashion students had no adequate knowledge on the term Circular Economy, while 35% had adequate knowledge. This data surprised

the researcher as fashion is one of the industries that produces a lot of waste in the world, hence fashion students should be reading or researching on such topics. School staffs however had a lot of respondents (70%) having knowledge on the term Circular Economy, while 30% had not come across it before.

It was however interesting to note that, majority (64%) of students threw their scraps produced after garment production into the bin, 22% burnt them and only 14% thought the scraps could be used to something new other than just putting them in the bin or burning them.

School staff's data also revealed that majority (70%) of the workers were females while the rest (30%) were males. 70% fell between the age range of 25 – 35, 25% between ages 36 – 46 and finally 5% between the ages of 47 or above. It was again revealed that just a few (20%) institutions were actually encouraging their students in making use of these scraps they produce by giving them projects to create something new out of it. 15% burn the scraps made by students and 65% put them in dustbins as ways of managing the waste created within the institutions.

Data from students indicated that they had practical ideas of making use of these scraps other than just disposing them off. Majority (64.3%) of them suggested using the scraps for new garments, 18.6% suggested fashion accessories like earrings, necklaces, hair scrunchies while 14.3% suggested paper or fabric artwork like wall hangings and 2.8% had no idea what to use the scraps for.

Majority (65%) of staffs revealed that paper and fabric scraps produced by students are put in the dustbins, 20% however made it known that students are most often given projects to make use of the scraps, while 15% indicated the scraps were burnt. This still

reveals that the education on re-using of scraps to produce other items needs to be intensified and practiced in these fashion institutions.

6.3 Conclusions

Garment making comes with a lot of paper and fabric scraps after productions. Measures must be considered thoroughly in making good use of these scraps so it does not always end up in the dust bins or burnt to create further pollution. There is the need for fashion institutions to include in their curriculum, research works on how to make use of paper and fabric scraps, fashion craftworks which will teach students ways of making use of scraps after production. Fashion students must also be educated on the importance of employing ways of using these scraps after production.

Making of new garments are not the only ways of making use of these scraps, these scraps can be used for fashion accessories such as bracelet, necklace, earrings, coverings of old shoes as well as some art works like paper wall hanging and fabric wall hangings.

A gradual conscious effort by fashion students to research and read more on fashion waste and measures to minimize it will go a long way on broadening their mindset on the career path taken. Managements of fashion institutions should include circular economy or fashion sustainability in their curriculum to create awareness on Circular Economy or Fashion Sustainability to help in minimizing the waste generated with in various fashion institutions in Accra and Ghana as a whole.

6.4 Recommendations

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

1. It is recommended that the theory of circular economy or sustainable fashion should be introduced to the curriculum of fashion institutions so every student within a fashion institution will gain information and knowledge on the importance of minimizing and making use of fabric and paper waste
2. Fashion projects on fashion sustainability or making use of paper and fabric waste in creating any other work aside garments should also be introduced in fashion institutions.
3. Finally, fashion students should be made aware that instead of just disposing off fabric and paper waste by putting them in the waste bins or burning them, these scraps can be useful for some art works which can be sold when creatively done.

6.5 Suggestions for Future Research

Based on the findings of the study, the researcher suggests the following areas for further research:

There is the need for further research to find out if students make use of waste generated during garment production after school when they set up their own shops and business

Further research could be made on zero-waste pattern making by looking at the introduction of Computer Aided Design (CAD) pattern making and marker making in our fashion institutions which will help reduce wastage of paper and fabric.

Further research could also be made to delve deeper into the impact of paper and fabric waste on the Ghanaian environment.

Other fashion institutions could also be researched on to know how they manage and handle waste produced within the institution.



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APPENDICES

Appendix A: Questionnaire for students

UNIVERSITY OF EDUCATION, WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

FACULTY OF VOCATIONAL EDUCATION

This questionnaire is designed to enquire about circular economy; minimizing paper and fabric waste in some selected fashion institution in Accra. Please respond to the items as frankly as possible. The information you provide will be used solely for academic purposes. Thank you. **Please tick where appropriate.**

1. What's your age?

- 15-25
- 26-36
- 37 - above

2. What's your gender?

- Male
- Female

3. What's your educational level?

- JHS
- SHS
- Tertiary
- Other:

4. Which institution are you in?

.....

5. Do you take waste reduction into consideration during garment production?

- Yes
- No



6. What do you understand by waste management?
- Disposing off waste
 - Burning waste
 - Making another use of the waste (reusing)
7. How do you manage paper and fabric waste after garment production?
- Put the waste in the dustbins
 - Burn the waste
 - Use the scraps to create something again
8. Has the increase in fashion institution in Ghana contributed to increase in disposable waste?
- Yes
 - No
9. Does paper and fabric waste pose environmental hazards in the society?
- Yes
 - No
10. Does paper and fabric waste pose environmental hazards in your school?
- Yes
 - No
11. Have you heard of circular economy?
- Yes
 - No
12. Is your school practicing circular economy?
- Yes
 - No
13. Will the awareness/ knowledge of circular economy in waste management impact the environmental health in Ghana?
- Yes
 - No



14. Can the knowledge of circular economy in waste management bring some changes in your school?

- Yes
- No

15. Are you willing to share the knowledge of circular economy in fabric and paper waste management with friends?

- Yes
- No

16. Have you thought of making use of fabric and paper waste rather than disposing them?

- Yes
- No

17. Can being creative with paper and fabric scraps minimize the waste created after garment production?

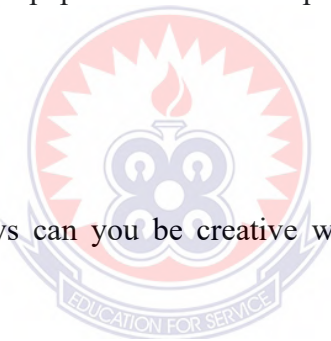
- Yes
- No

18. In what practical ways can you be creative with fabric and paper scraps after garment production?

- Art works
- Creating a new garment
- Fashion accessories
- No idea

19. Have you tried your hands with any of these works?

- Yes
- No



Appendix B: Interview questionnaire for staffs

UNIVERSITY OF EDUCATION, WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

FACULTY OF VOCATIONAL EDUCATION

This questionnaire is designed to enquire about circular economy; minimizing paper and fabric waste in some selected fashion institution in Accra. Please respond to the items as frankly as possible. The information you provide will be used solely for academic purposes. Thank you. **Please tick where appropriate**

1. What's your age?

- 25-35
- 36-46
- 47 – above

2. What's your gender?

- Male
- Female



3. What's your educational level?

- 1st Degree
- 2nd Degree
- PHD
- Other:

4. Which institution are you in?

.....

5. What is your position?

- Administrator
- Teacher
- Other Staff

6. Does your school teach fashion craft?

- Yes
- No

7. Does your school take waste reduction into consideration during garment production?

- Yes
- No

8. What do you understand by waste management?

.....

9. How does your school dispose off paper and fabric waste after garment production?

.....

10. Has the increase in fashion institution in Ghana contributed to increase in disposable waste?

- Yes
- No

11. Does paper and fabric waste pose environmental hazards in the society?

- Yes
- No



12. Does paper and fabric waste pose environmental hazards in your school?

- Yes
- No

13. Have you heard of circular economy?

- Yes
- No

14. Is your school practicing circular economy?

- Yes
- No

15. Will the awareness of circular economy in waste management impact environmental health in Ghana?

- Yes
- No

16. Can the knowledge of circular economy bring change in your school?

- Yes
- No

17. Have you thought of allowing your students to reuse fabric and paper waste scraps for creative works other than disposing them off?

- Yes
- No

