Journal of Innovations in Art & Culture for Nature Conservation and Environmental Sustainability
Vol 1 No 1 (2023): https://journals.adompublications.com/jinces/index
DOI: https://doi.org/10.60129/jinces.v1i1.00423

RESEARCH ARTICLE

Thinking through Environmental Sustainability of Waste Plastic Bottles: A Creative Art Approach

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Article History
Received 2023-03-08
Revised 2023-05-10
Accepted 2023-05-20
Published 2023-06-04

Keywords
Artistic works
Environmental sustainability
practice-based research
sofa
waste plastic bottles

How to cite

Donkor, E. K., Agbeshie, A. & Darpoh, A. (2023). Thinking through Environmental Sustainability of Waste Plastic Bottles: A Creative Art Approach. *Journal of Innovations in Art & Culture for Nature Conservation and Environmental Sustainability*, 1(1): 39-60.

Abstract

The study used a creative art approach to investigate solid waste such as plastic bottles and convert them into an artistic sofa as part of contributing to Ghana's national development of the Millennium Development Goals (7th goal) to ensure environmental sustainability. The practice-based research inquiry was employed with the recycling method of assemblage and construction technique to expose this artistic outcome. Through a descriptive analysis tool, the study revealed that the practicability and viability of waste plastic bottles could be an effective way to raise awareness and promote change in the way society uses and disposes of plastic. Based on the outcome of the study, artists should collaborate with civil engineers on the production of waste plastic bottles as viable materials for construction by exploring their artistic values, strengths, and techniques.

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1. Introduction

The most prevalent thermoplastic polymer resin of the polyester family used for beverage and food containers in Ghana are plastic bottles (Metratrade, 2018; Donkor, Micah, & Akomea, 2021). The high demand for plastics and the mishandling of plastics by consumers have been at the heart of the plastic waste problem in the environment. The excessive disposal of plastics in the environment has caused challenges like choked drainages and landfills. Environmental sanitation policies on solid waste have been long established in Ghana to curb solid waste issues such as plastic waste pollution (Donkor et al., 2021; Kehinde et al., 2020).

Bonifazi, Gasbarrone, and Serranti (2021) espoused that plastics have taken over the packaging world as well as post-consumer plastic packing waste, especially when it comes to disposable containers. Most food wraps, soft drinks, and water containers, which used to be glass bottles and metal cans, are now mostly made of plastic, maybe due to their cheap cost and lightweight (Donkor et al., 2021; Gupta, 2006). In terms of water containers, plastic has taken over the market. It comes in the form of sachets and bottles. It is easier to carry and convenient for marketing purposes (Stoler, Weeks, & Fink, 2012).

Plastic bottles, as non-biodegradable materials, do not break down into simpler components and stay permanently in their form, becoming an environmental canker (Letcher, 2020). Used plastics have become a problem for today's waste management systems in Ghana. Due to their molecular stability, plastics do not easily break down into simpler components. Hence, plastics are considered non-decomposable or not biodegradable (Letcher & Vallero, 2011). Therefore, doing away with them as waste has become a challenge for managers of our solid waste systems. And in Ghana, waste plastic is found everywhere and has become a canker.

Now the question is: can the world we live in now do without plastics? This situation is a nut to crack for many. Today's world relies so heavily on plastic to the extent that one cannot tell how we can cope for a single day without making use of it. Plastic has taken centre stage in almost every domestic product, either wholly or partly, almost all electrical appliances, parts of room furniture, bags, eatery utensils, floor coverings, doormats, bathmats, table mats, doilies, domestic heaters, fridges, and many others. There is an Akan (Twi) proverb that goes, "ma okɔ nsuo, na obɔ ehina", meaning "he who fetches water breaks the pot" (Micah, Donkor, & Ankrah, 2021; Donkor, Ankrah, & Boakye-Yiadom, 2022). Man has made plastics for beneficial purposes, but in another dimension, plastic waste is causing danger to man and his environment.

As cited in the Ghana Statistical Service's (2013, p. 45) 2010 population and housing census report, a desk study carried out by the Water and Sanitation Programme (WSP) (2012) showed that "sanitation continues to pose a serious challenge to the country. It is believed that poor sanitation costs the economy of Ghana about $290 million per year". Saklad (2020) attests that Ghanaians generate over a million metric tonnes of plastic waste each year, and only between

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2% and 5% of this plastic waste gets properly recycled. Many places within the country lack the infrastructure to dispose of plastic waste. The severity of the problems is indicated by the fact that Ghana ranks among the top 10 most polluted countries in the world (Saklad, 2020).

Earth Care Ghana (2022, p. 1) adds that "the United Nations Development Programme (UNDP) has emphasised the urgent need for waste management and plastic pollution in Ghana to be addressed". According to a study by Geyer et al. (2017), global plastic production has increased exponentially over the past few decades, leading to a corresponding increase in plastic waste. This waste often ends up in landfills or oceans, where it can harm marine life and other wildlife (Geyer et al., 2017). Now that there is an urgent need to address such a situation, especially around Effiakuma New Site, Takoradi, Ghana, and the process of using creative art to address solid waste, such as plastic bottles, has received less academic literature and documentation that involve environmental conservation. For this reason, there is a need to use a creative art approach to investigate solid waste such as plastic bottles and convert them into an artistic sofa as part of contributing to Ghana's national development of the Millennium Development Goals (7th goal) to ensure environmental sustainability. In an attempt to create a platform for dialogue, raise awareness, and inspire change, art has been shown to be a powerful tool for engaging people in environmental issues (Kagan, 2019; Adom, 2021; Adom, Donkor, & Asante, 2023).

2. Literature Review

2.1 Theoretical framework

The study employed Alison Gwilt and Timo Rissanen's (2019) theory of eco-design as a design philosophy that sought to minimise the environmental impact of products and systems by considering their entire life cycle, from raw materials to disposal. It was applied to the use of plastic waste bottles in art to promote sustainability and reduce waste. According to Gwilt and Rissanen (2019), eco-design involves several key principles, including the use of environmentally friendly materials, designing for durability and reparability, and considering end-of-life options for products. In the context of plastic waste art, these principles guided the study in selecting recycled or biodegradable plastics, designing pieces that are durable and repairable, and considering the disposal or recycling options for their art. For example, artist Aurora Robson creates intricate sculptures from discarded plastic bottles and other waste materials, employing eco-design principles to minimise waste and promote sustainability (Robson, n.d.). Robson uses recycled plastic and employs a range of techniques such as cutting, sanding, and heating to transform waste into intricate sculptures that are both aesthetically pleasing and environmentally conscious. Incorporating eco-design principles into plastic waste bottle art not only promotes environmental sustainability but also encourages artists to be more mindful of their material choices and creative processes.

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2.2 Recycling Plastic Waste

Plastic waste has existed since the 1970s. Globally, the plastic waste situation has caught individuals' attention to recycle these waste plastic materials into a new commodity. People who care about the environment and global health have been worried about how to dispose of plastic once it has been used (O. Berk, 2021). Furthermore, O. Berk (2021, para. 2) adds that today, about 60 million water bottles are thrown away every day in America, and it can take up to 700 years for just one plastic bottle to break down in a process called biodegrading, which is also the process that happens when a piece of fruit rots. To solve these problems, people have worked together to develop a process to recycle plastic bottles and convert them into other useful items, including clothes, furniture, fences, and new plastic bottles, bags, and containers.

The plastic waste situation around the globe has made room for recycling. Therefore, plastic recycling is the process of recovering scrap or waste plastics and reprocessing the material into useful products. Plastic recycling includes taking any type of plastic, sorting it into different polymers, chipping it, and then melting it down into pellets (Singh & Kumar, 2021, p. 47; Leblanc, 2020). In talking about recycling, many have mistaken it for the reclamation of material from the waste, which is just a part of the entire process. Dolan, Lampo, and Dearbom (1999) defined recycling as reprocessing a reclaimed material and converting it. To concur with this definition, Melby and Cathcart (2002) also defined recycling as the removal of material from waste and then following it up by reusing it. So in both cases, there is a need to reclaim and reuse. Therefore, one can conveniently say that recycling is the process of converting waste materials into new and usable materials and products. Recycling is the most essential process for survival. It is one of the best ways for mankind to make a positive impact in this world of ours. It is a very important process in our lives, as waste has massive deleterious effects on the natural milieu. It is a key constituent of modern waste reduction. Also, it is the third component of the famous "Reduce, Reuse, and Recycle" cliché of the waste hierarchy.

Recycling can help promote a serene environment, reduce the cost of living, and reduce the outbreak of certain illnesses associated with hygiene. A human byproduct of carbon dioxide is consumed by plants, which also give out oxygen, which in turn is consumed by humans once again. This situation is a perfect form of nature's recycling process. Recycling can be a major antidote to waste management and a very important technique in the minimization, prevention, or avoidance of waste, which helps reduce the degradation of the environment. People have recycled materials throughout history. Metal tools and weapons have been melted, reformed, and reused since they came into use thousands of years ago, and a 1977 United States Environmental Protection Agency report attested to that fact. The iron, steel, and paper industries have almost always used recycled materials.

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Recycling conserves natural resources by reducing the need for new materials. Some natural resources are renewable, meaning they can be replaced, and some are not (Gupta, 2016). Paper, corrugated boards, and other paper products come from renewable timber sources. Trees harvested to make those products can be replaced by growing more trees. Iron and aluminium come from nonrenewable ore deposits (Ankrah, Donkor, & Micah, 2022). Once a deposit is mined, it cannot be replaced. Hence, it is advisable to make use of their waste by recycling them to give a new face to the used one and preserve or conserve the natural ore deposit for future exigencies. In most cases, the process of recycling reduces energy requirements for processing new materials (Gupta, 2016). For instance, making an aluminium can from recycled metal takes only 5 percent of the total energy needed to produce the same aluminium can from new materials, a 95 percent energy savings. Recycled paper and paperboard require 75 percent less energy to produce than new products (Gupta, 2016). In the same way, consideration of energy savings is derived from the recycling of steel and glass.

Recycling could reduce pollution in the environment compared to producing new material. For every tonne of newspaper recycled, 7 fewer kg (16 lb) of air pollutants are pumped into the atmosphere (Gupta, 2016). It can also reduce pollution by recycling safer products to replace those that pollute. Some countries still use chlorofluorocarbons to manufacture foam products such as cups and plates. Chang (2000) believes that chlorofluorocarbons are harmful to the atmosphere's protective layer, ozone. Therefore, using recycled plastic instead for those products eliminates the creation of harmful chlorofluorocarbons. Recycling saves valuable landfill space; land that must be set aside for dumping trash and construction debris will not be required as waste is reduced through recycling (ICLEI Oceania, 2023). In most municipalities, worldwide landfill sites fill up quickly, and getting new sites becomes problematic as neighbours of the new site become apprehensive due to the stench, noise, and hazard of leakages into underground water supplies. The two major ways to reduce the need for new landfills are to generate less initial waste and recycle products that would normally be considered waste (Rao, 1998).

A 2007 study done on recycling in New Zealand established the fact that the overall recycling rate may have an upturn from 38 percent to 80 percent while at the same time providing society with net economic benefits (Harris & Roach, 2017). The study further found that recycling is on the whole profitable for paper, used oil, metal, glass, and concrete. In the case of plastic recycling, the economics are mixed; while it generally makes economic sense to recycle polyethylene terephthalate and high-density polyethylene, it is not profitable to recycle polyvinyl chloride or low-density polyethylene (Boulder County, 2023).

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Figure 1: Choked gutter with plastic bottles and landfill site at Effiakuma New Site -Takoradi

2.3 Eco-Artists and their Art of Recycling Plastic Waste

As part of the modernist rebuff of the use of traditional materials in fine art and the consequent yearning to lay bare the fact that "art" can be made out of anything (Smith & Wilde, 2002). Artists have been creating sculpture, assemblage, combined paintings and sculptures, and installations from an ever-widening range of unusual objects and materials. Nowadays, art and recycling go hand in hand. This situation has brought about what is known as "eco-art" (Art in context, 2022). Amazingly, eco-artists are transforming old, recycled, and reused objects into contemporary art (Eshun & Donkor, 2021). Many artists in Africa, the Middle East, and other regions have recently begun to express their support for recycling and sustainability through artworks that combine traditional tones with modern themes to create eye-catching installation art that expresses local cultural heritage in the interests of the general public. Artists use a variety of recyclable materials, including glass, cans, plastics, papers, CDs, PET bottles, and others, to convey their emotions and ideas (Al-Banna, 2022; Pratt, 2022).

Recycling has inspired many environmental artists. Amongst these artists are El Anatsui (who uses bottle tops among other thrown-away objects as his materials) and Sofo Elijah (who uses used water sachet bags and abandoned posters). Figures 2 and 3 illustrate some of the works of Elijah Sofo and Essilfie Banton. These eco-artists search for inspirations that surround them while they express their feelings in their artworks (South, 2018; Asamoah et al., 2022). These artists use recycled or reused objects to make attractive contemporary art and turn everyday trash into creative treasures (Al-Banna, 2022). Some create compositions from recycled plastic bags or themed works for art galleries, while others create entire theme parks with trash and furniture made from recycled materials. For example, if an artist has a penchant for collecting beverage

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cans, he could collect recyclable materials through public donations, collaboration with businesses, or direct collection from the solid waste stream. This innovative approach not only creates environmental awareness but also helps find a good use for unwanted materials (Debrah, Diogo, & Dinis, 2021). Eco-artists are creating works of art from recyclable materials all around the world, adding to the Green Movement that is sweeping through various facets of society (Al-Banna, 2022). Artists find innovative ways to show their concern for the environment. Thus, they encourage the masses to reuse, reduce, and recycle for a better future.

Figure 2: Plastic sachet waste, found fabric, raffia and rattan (Courtesy the Artist-Elijah Sofo, 2021)

Figure 3. Essilfie Banton and his artwork (source: Sedode, 2021)

3. Materials and Methods

The geographical location for the study was the Effiakuma New Site in Takoradi, Ghana. Effiakuma New Site is a melting pot of marketing trades, cultures, and ethnicities. The study aimed to capture these unique insights and values from the environmental issues with solid waste that abound in the area. This study employed on practice-based research inquiry using

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the recycling method with assemblage and construction techniques to convert waste plastic bottles into an artistic outcome. According to Candy (2006, p. 3), "practice-based research is an original investigation undertaken to gain new knowledge, partly employing practice and the outcomes of that practice". In this study, the claims of originality and contribution to knowledge are demonstrated through creative outcomes in the form of an artistic sofa. Through a descriptive analysis tool, the significance and context of the claims are described in words, and the entire understanding is obtained with direct reference to the outcome (Candy, 2006). This practice-based research gave a descriptive analysis and working processes of the entire claim of the artwork. It starts with a detailed description of the tools and materials used in executing the artwork. The following were the steps taken before the execution of the final work:

a. Tools and materials used for the work,
b. Quantities of waste plastic bottles needed.

3.1 Tools and Materials

Various tools and materials were incorporated into the execution of the artwork. Tools were appropriate for capturing, creating, and manipulating the materials. Materials were used as viable and practicable substances for making the artwork. Gilbert (2014) is of the view that understanding and using the right tools and materials to create a work of art can make a monumental difference in appearance, texture, permanence, and more. No matter what medium an artist may use, there are many choices to make and things to consider when beginning a new work of art. The following tools and materials were used for the execution of the artwork:

a. A knife metal cutter was used to cut the neck section of the plastic bottles.
b. The foam cushions were used to create cushions for the seat, backrest, and armrest.
c. Super glue liquid adhesive was used to adhere the plastic bottles together.
d. The nylon thread was used to sew the plastic bottles and fabric.
e. Measuring tape was used in measuring the height of the accurate size of the chair.
f. Pens and pencils were used to make the working drawings.
g. The scorching tool was used to pierce holes through the plastic bottles before sewing.
h. Strawboard was used to support the base of the plastic bottle.
i. Waste plastic bottles (used Voltic mineral plastic bottles): Waste Voltic mineral plastic bottles were used to make the chair.
j. Waste fabric pieces were used to cover the cushions of the seat, backrest, and armrest.

3.2 Quantities of waste plastic bottles needed (X = multiply)

The quantity of waste plastic bottles needed for a sofa will depend on the size of the sofa, the design of the sofa, and the thickness of the plastic bottles used. The study made a rough estimate of the quantities of waste plastic bottles needed for a standard-sized sofa:

a. Seat cushions: Depending on the thickness of the waste plastic bottles used, the study needed between 200 and 500 plastic bottles per seat cushion. For a standard-sized sofa with three seat cushions, this would require between 600 and 1500 plastic bottles.
b. Back cushions: Again, depending on the thickness of the waste plastic bottles used, the study needed between 100 and 300 plastic bottles per back cushion. For a standard-sized sofa with three back cushions, this would require between 300 and 900 plastic bottles.
c. Armrests: The quantity of plastic bottles needed for the armrests depended on the design of the sofa. A simple design was chosen in Figure 4. This only required a few dozen waste plastic bottles, while a more elaborate design could require several hundred.
d. Frame and support: Depending on the design of the sofa, the study needed additional plastic bottles to create the frame and support structure. This idea depended on the size and complexity of the design.

Table 1: Quantities of waste plastic bottles needed for a standard-sized single sofa

S/n	Description	Quantities of waste plastic bottles in a column	Total
1.	Head rest	8 x 3	24
2.	Arm rest	16 x 4	64
3.	Back rest	14 x 4	56
4.	Seat/Base	28 x 4	112
	Grand total		**256**

4. Results and Discussion

4.1 Pre-designing stage

The pre-designing stage of this creative art approach saw an important part of the creative process of art by designing a standard-sized single sofa. This process was a means of planning the execution of the work. It involved a series of steps that helped the study define its goals, gather information, and brainstorm ideas.

4.1.1 Working drawings

The study employed a working drawing to develop a good concept for the artwork. It considered the idea and form that the single sofa was supposed to take, hence making several

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working drawings of sofa types. Figures 4 and 5 are the initial or primary working drawings made for the artwork. The working drawings provided a dimensional and graphical concept for the study to use or construct the artwork. Conceptually, the working drawings consist of two-dimensional orthographical projections of the sofa, such as plans, sections, and elevations (South, 2018). These working drawings were drawn by hand with dimensions and further prepared to scale using computer-aided design (CAD) software (CorelDraw). The dimensions of the sofa measure 90.5 x 90.4 x 80.5 cm (height x length x breadth), as illustrated in Figures 4 and 5. As technology continues to change, the study used a computer as a piece of digital equipment and software. Upon careful observation, the study considered the selected sketch-c due to its compatibility and the likelihood of lasting longer.

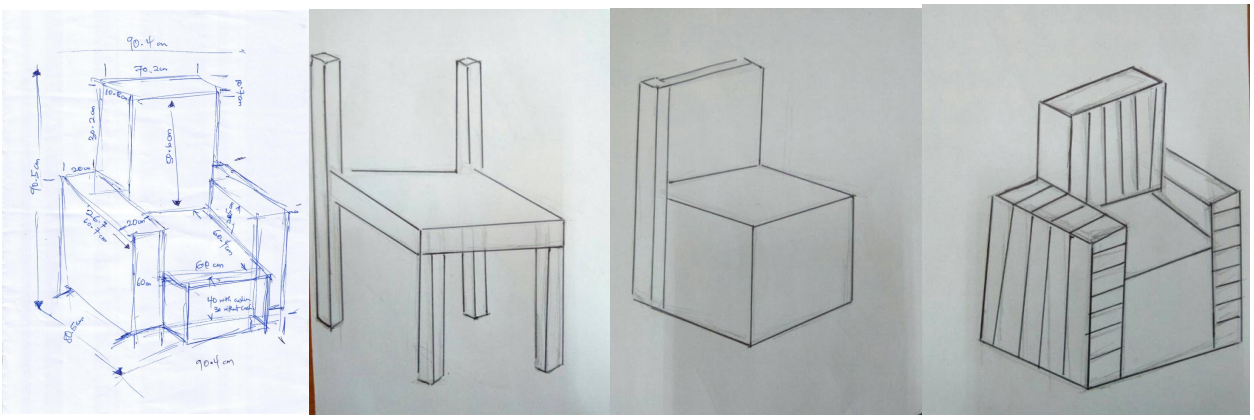

Figure 4: Hand dawn working drawings of the standard-size single sofa

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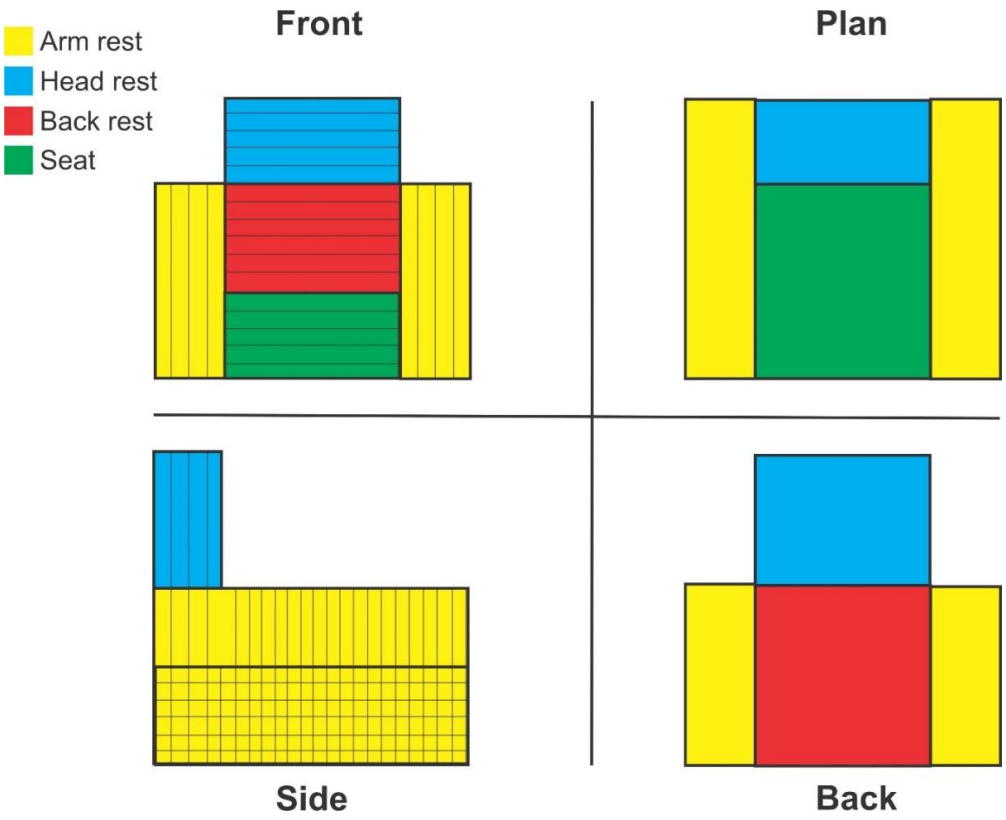

Figure 5: Computer-aided design projections on the single sofa

4.1.2 Budget/Analysis of costs

The cost analysis for waste plastic bottle art depended on several factors, such as the size of the art piece, the complexity of the design, and the materials and tools needed to create the art piece. Identifying the design constraints, budget for materials, time, and technical limitations were projected to help the study narrow down its options and make more realistic design decisions.

Table 2: Analysis of costs for waste plastic bottles sofa

S/n	Item	Description	Total metric &	Unit price	Total price
1.	Waste plastic bottles	Waste voltic bottle water	1.5L / 256 pc.	-	-
2.	Super glue liquid adhesive	5 kg of liquid glue	2 conts.	10 x 2	20
3.	Knife	9" stainless steel knife	1 pair	30 x 1	30

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8.	Measuring tape	26 ft. / 6.1 x 4.6 x 2 inches	1 pc	50 x 1	50
9.	Foam cushion	High density (L40 x W32 x H6)cm	2 cushions	95 x 2	190
10.	Nylon thread	100 g bonded nylon sewing thread	1 pc	20 x 2	40
11.	Strawboard	900 g / 30"x40"	1 sht.	50 x 3	150
12.	Scorching tool	Corded Electric, 11.73 x 5.32 x 19.75 inches	1 pair	200 x 1	200
	Grand total				**₵680.00**

* sht= Sheets, sq.= square, ft.= Feet, L= Litres, conts.= containers, kg= Kilogram, pcs=pieces, t/s=table spoon, " = Inches, x = Multiply, ml= , mm = Millimetres, ₵ = Ghana currency (cedi sign)

4.2 Designing stage

The designing stage of creating a waste plastic bottle sofa involved taking the ideas generated in the pre-design stage and transforming them into a concrete plan. The study worked on the detailed plan of the working drawings as a solid concept that outlines the materials, tools, and techniques needed to create the art piece. This confirms Gwilt and Rissanen's (2019) theory of eco-design for considering the overall structure, colour scheme, and any unique features that would make the art piece stand out. The study gathered the materials and tools needed to create the art piece (Al-Banna, 2022), including waste plastic bottles, cutting tools, adhesives, fabrics, and other finishing materials.

4.2.1 Production process of the standard-sized single sofa

The study employed three stages of design processes in executing the single sofa. The study employed the preparation of the waste plastic bottles, the arrangements of the seat, the armrest, and the backrest, and the finishing of the sofa.

4.4.1 Preparation of the waste plastic bottles

The waste plastic bottles were hand-picked, washed, cleaned, and sorted out one after the other to remove the damaged ones. The knife was used to cut some of the bottles into two halves to get the right length at the edge. Also, the bottles were fixed in place between each other to get

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the needed length for the construction of the furniture. The bottles were trimmed to a fine and even edge. The corks of the bottles were glued tightly to the bottles to maintain the pressure in the bottles. The uncut bottles were tucked into the cut ones.

4.4.2 Arrangement of the seat, armrest of the sofa and backrest

A strawboard was used as the base of the sofa to hold it firm. The adhesives were added to the first layer of the plastic bottles at the base. The strawboard served as support for all four layers of the seat. The plastic waste bottles were arranged equally in a straight line. Three holes were drilled at the top, middle, and lower parts of each bottle with the aid of the scorching tool. The bottles were arranged and sewn together with nylon thread and a bodkin. After achieving the required shape, it was then sewn to the seat. The top and bottom of some bottles were cut off, then joined with full bottles at both ends. The procedure was done on several bottles to achieve the preferred shape and size. It was then evenly aligned, holes punched, and hand-sewn for rigidity. The whole unit or block was then hand-sewn to the armrest. It was finally adhered with glue to make it stronger.

4.4.3 Finishing the sofa

Waste fabrics (pieces of cut-offs) were collected from various tailors. The collected pieces of fabric were used as covers for foam cushions. The fabric cover and the foam were sewn into a preferred fabric seat cover. The seat size was taken into consideration. The fabric covers serve as cushions for the seat, armrests, and backrests. Sewing the waste fabrics into cushions was used for both arms and the backrests. The cushions were sewn with nylon thread and adhered to the bottles to cover some portions of the structure formed, making both armrests immovable and leaving the brand of the bottles to show. Finally, both removable cushions were placed on the sofa, as shown in Figure 5.

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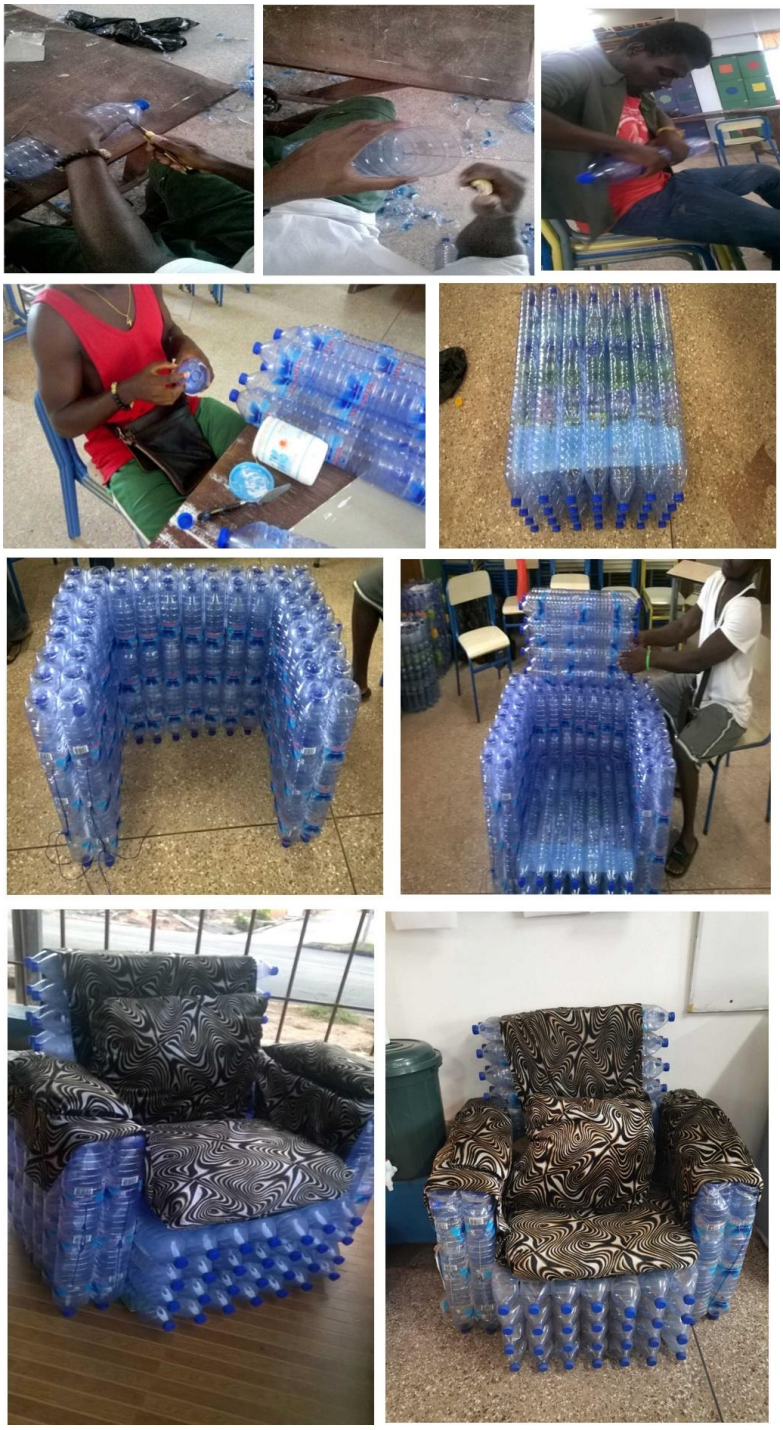

Figure 5: The designing stage of the sofa

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4.2 Post-Designing stage

The post-designing stage of creating waste plastic bottle art involved the final steps in bringing the sofa to completion. The study conducted a quality check before showcasing the sofa for audience responses. This was to ensure that it meets the audience's expectations and is free from any defects or damage.

4.2.1 Audience responses

Audience responses to the waste plastic bottle sofa varied widely depending on the individual participant. Audience responses to the waste plastic bottle sofa were based on:

1. Amazement: Some viewers were amazed by the creativity and ingenuity of using waste plastic bottles to create beautiful and unique art pieces.

Participant 1:

"Wow, this sofa made from plastic bottles is incredible!" "It's amazing how the artist was able to turn something that would have been thrown away into a work of art."

Participant 2:

"Wasteful plastic bottles don't sit well with me. They pose a threat to the environment. Using waste plastic bottles for a sofa is environmentally conscious."

2. Curiosity: The audience was curious about the process involved in creating the sofa and was interested in learning more about how it was made.

Participant 3:

"This installation made from recycled plastic bottles really makes me think about our relationship with waste and the environment." "It's a powerful message about the importance of recycling and upcycling."

3. Environmental awareness: Waste plastic bottle art may also raise awareness about the issue of plastic waste and the importance of recycling and upcycling.

Participant 4:

"It's great to see artists using their talents to address environmental issues like plastic waste." "We need more creative solutions like this to help us tackle the growing problem of plastic pollution."

4. Inspiration: Some viewers may be inspired to create their own waste plastic bottle art or to find other creative ways to repurpose waste materials.

Participant 5:

"I never would have thought waste plastic bottles could be used to build a sofa in this way before." "It's given me some great ideas for ways I can reuse and repurpose items in my own life."

5. Scepticism: On the other hand, some viewers may be sceptical about the value or durability of waste plastic bottle art or may be critical of the environmental impact of using plastic materials in art.

Participant 6:

"While the idea of using waste plastic bottles in art is intriguing, I worry about the longevity of the pieces." "Will they hold up over time, or will they break down and contribute to the plastic waste problem once again?"

Audience responses to the waste plastic bottle sofa varied widely, with some expressing enthusiasm and admiration for the creativity and environmental message behind the pieces (Asamoah et al., 2022), while others expressed scepticism about their durability, artistic merit, or ability to make a meaningful impact on the problem of plastic waste (Adom et al., 2023). Some viewers appreciate the novelty of using recycled materials in art, while others worry that it could distract from the larger issue of plastic pollution and the need for more concrete solutions (Adom, 2021). Ultimately, audience responses reflected a range of perspectives and opinions, highlighting the complexity of the issue of waste plastic bottles and its place within the broader environmental conversation.

Conclusion

It was established from the study that the excessive disposal of plastics in the Effiakuma New Site, Takoradi and its environs has caused challenges like choked drainages and landfills. These uncontrolled plastic waste issues hurt the environment. Environmental sanitation policies on solid waste have been long established in Ghana to curb solid waste issues such as plastic waste pollution. Environmental artists who care about the environment and global health have tried to add value to waste plastic disposal through the production of plastic art. Environmental artists and people of other walks of life have worked together to solve these plastic waste situations. They have developed processes to recycle plastic bottles and convert them into other useful items, including clothes, furniture, fences, and new plastic bottles, bags, and containers. In addition to these values, the study sought to use waste plastic bottles to make an artistic sofa. The claim of the study received lots of congratulatory messages from audience responses when it was exhibited.

DOI: https://doi.org/10.60129/jinces.v1i1.00423

From the study, it was evident that the production of the sofa opened up recycling as a means of curbing haphazard ways of disposing plastic waste and using plastic detritus as a form of artistic means. The single sofa was an art product made from waste plastic bottles, foam, and fabric waste. It had translucent waste plastic bottles and was dominated by shades of blue, which was the dominant colour of the water-producing company (Voltic Ghana Limited). The arrangement of the bottles was rendered in a linear array in a repetitive and dominating order. This style was contrasted with the display of the cushion in a different sequence. The arrangement of the bottles created a sense of coherent rhythmic movement in an apparent swinging coil. The artwork was symmetrically balanced. The label was kept intact on the bottles to spruce up the work with their colours and advertise the water-producing company (Voltic). The patches of blue gave off a feeling of coolness and love.

Through this creative art approach, awareness was created for people within the New-Site, Takoradi community who saw the sofa and felt they had wasted good materials that were seen as waste by throwing them away when they could have used them for something good. Hence, the focus of this practice-based research tends to be helping people by handling plastics with care and creating an eco-friendly environment without plastic waste. This statement was partially droned down into the audience's minds. The single sofa tends to help educate on recycling and has aesthetic appeal by serving as an environmental check.

Implications for Practice and Policy

The study recommends that:

1. Waste plastics can provide a platform for artists, designers, and engineers to express their creativity, aiming to foster dialogue, collaboration, and innovative solutions to address these pressing environmental concerns. This can lead to the development of innovative and impactful art pieces that inspire and educate the public. Therefore, artists should collaborate with civil engineers on transforming waste plastic into viable materials for the construction of useful items by exploring their artistic values, strengths, and techniques.
2. Young artists should be encouraged to recycle plastic waste material for their artworks, as it is a whole business profession that could bring in so much income. This type of art should be encouraged because it is less expensive as compared to sofas made from other materials like wood, which even create deforestation in the natural environment.
3. The use of waste plastic bottles in art can also highlight the need for better recycling infrastructure and the development of new recycling technologies. This can lead to the implementation of policies that support the development of sustainable waste management practices.

Funding: This research received no external funding.

Acknowledgments: We are grateful to Robert Fietsi and Samuel Ofori Kweku for their research assistance during the designing stage of the work.

Conflicts of Interest: The authors declare no conflict of interest.

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Alex Darpoh is a lecturer at the Department of Industrial Painting and Design, Takoradi Technical University, Takoradi. He holds an MA in Art and Culture from the University of Education, Winneba. Like Karl Marx, Darpoh believes 'art is not a mirror held up to reality but a hammer with which to shape it," and he uses his 'hammer' to rejuvenate, revitalise, and give life to things otherwise seen as waste. He uses this 'waste' as his pigment to make his art.

Authorship and Level of Contribution

Both authors contributed equally.

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