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# FROM TRASH TO TREASURE: UP-CYCLING OF DISCARDED LOOSENED FAUX HAIR TO FOOTWEAR FOR FASHION PURPOSES.

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**ABSTRACT**

*Lately, artificial hair extensions have become important fashion accessory to many females. They are employed to enhance most peoples' looks by attaching onto natural hair. They are manufactured few companies that see them as a thriving business since many people need them. In Nigeria, the number of users increases during the festive periods because many females will like to be identified with braided artificial hair. The prices double during this period. However, it has been observed that in as much as they are expensive, they are discarded after a single use. As a result, the waste becomes a problem to the built environment. Since most are synthetic, when discarded in refuse dumps, they are not biodegradable. Therefore, this study argues that since these hair attachments have the same compositions as some other synthetic fibers which could be up-cycled, they could be woven with the aid of a loom into re-usable items, which will go a long way to reduce the number sent to the landfills. In this manner, they could be sustained so as not to pose some threats to human beings in the environment. This is qualitative research and it used the studio based experimental method. Photographs are used as research instruments for documenting the studio exploration. It employed the cradle-to-cradle design concept and ethical fashion concept for analysis. One of the findings is that the hair extensions wastes were appropriate for weaving a synthetic fabric that was used to make footwear. It concludes with the view that the rubbish (used faux hair) should be up-cycled to benefit mankind.*

**Keywords**: Up-cycling, Sustainability, Artificial hair, Fashion design, Built environment.

## Introduction

Humans have always been obsessed with beauty, which has led to the development of everything from fashion to makeup. Hair is seen as a traditional emblem of health and beauty in many different cultures. In the ancient past, hair was a major sign of prosperity and aristocracy. According to the aforementioned, some extensions were required to enhance the natural hair in order to accomplish that. Wigs and hair extensions were therefore produced or sought after. Since then, wigs and hair extensions have spread over the world and grown to be widely associated with trends and fashion. In the past few years, hair extensions have gained popularity as a trendy dress accessory that many people use to experiment with different appearances. Their assistance in growing thicker, longer, and more glossy hair contributes to the user's increased self-esteem. To improve someone's appearance, extra natural or

synthetic hair strands are affixed to the person's natural hair to add volume, length, or desired styling effects. These extensions come in a variety of forms to suit various tastes and lifestyles, such as clip-ins, tape-ins, sew-ins, and fusion. The extensions are applied by securing them at the scalp so that they blend in smoothly with the natural hair. After that, they may be styled and handled just like regular hair. For individuals looking for a flexible option, hair extensions offer immediate makeovers and enhance confidence in one's appearance, making them a versatile alternative for people looking to experiment with new hairstyles without committing to long-term alterations (India Times, 2024). Regarding dates, cornrows are said to have originated in Africa around 3500 BC, in Egypt around 3100 BC, in Greece around the first century, in the halo braid in the first century, in Native American culture around the fifth century, in Europe, the crown braid between 1066 and 1485, in China, the staircase braid between 1644 and 1912, in the Caribbean around the 1970s, and on the Internet, where braid tutorials became particularly well-known in 2005 with the launch of YouTube (Allen, 2023).

In Nigeria, it has become common to braid hair using synthetic materials. Females and some males could be found wearing different styles and lengths ranging from neck length to ankle. Studies have shown that synthetic hair extensions can release some chemicals and heavy metals into the water and air when disposed of in landfills or heated during styling. In addition, they do not decay easily thereby contributing to the ever-increasing plastic pollution problems. This study's concerns are only on weaving with discarded synthetic hair extensions found during this study. It sought a way to up cycle some by weaving them manually with the aid of the simple frame loom in the combination of acrylic yarns used as the warp and some weft in the studio to produce a fabric for fabricating a pair of slipon (prototype). This is just an experiment to prove that the discarded used artificial hair could be up-cycled into foot wears. Subsequently, automated looms could be applied to achieve more specific and precise results.

## Problem of the Study

This study has observed that most females and a few males in Nigeria make use of hair extensions of various lengths while braiding. These attachments of different colours and types manufactured by some companies in Nigeria have become quite expensive to acquire. And if procured, they are often made use of once, thereafter, the hair is loosened. Then the used attachment is discarded, sent to the dustbin and eventually, the landfill. The hairdressers find it difficult to re-use a used hair attachment while the person with the long braids finds it extremely difficult to loosen them one by one because it consumes a

lot of time. Eventually, the hair attachment is cut from where the natural hair stopped, which is quite shorter than the attachment. The cutting renders the attachment more useless in that one could find the pieces littered all over the hair salons and environment. These synthetic hairs do not decay on time in landfills, they are completely man-made fabric, composed of petroleum or coal-based compounds. It would take approximately 20 - 200 years to decompose just like other synthetic fabrics (Mariano, 2021). Some are of the view that some can take up to +500 years to degrade (Twin Enviro Services, 2019). As they decompose in landfills, they release methane, a potent greenhouse gas that contributes to global warming and climate change since it has the potential to warm the planet 28 times more than carbon dioxide. Carbon dioxide emissions are significantly impacted by the buildup of textile waste in landfills. A sizable amount of the world's methane emissions are caused by the degradation of textiles in landfills. The impact of greenhouse gas emissions from textile waste is significant, and it exacerbates the problem of climate change which has serious implications for global ecosystems, human health, and well-being. As temperatures rise, it can lead to more frequent and severe natural disasters, rising sea levels, and the spread of infectious diseases. Therefore this study is of the view that if these hair attachments made of synthetic textiles, could be up-cycled to weave a fabric material by incorporating other synthetic yarns (like acrylic, polyester, polyethylene, nylon, vinyl etc.) since they contain almost the same properties to produce some fashionable items like footwear, perhaps it could go a long way to reduce the quantity of used attachments sent to the landfills in the built environment. Similarly, Kenyan entrepreneur by name Sarah Adero, recycles synthetic hair waste into mats and carpets (Majanga, 2023) for a living. Bearing in mind that they do not decay in time thereby posing some health threats to people living in the society. Thus, this study explored in the studio using some discarded synthetic hair attachments to weave a fabric that was used for fabricating footwear(prototype) with the aid of a manual simple frame loom.

## Aim of the Study

The aim of the study is to produce a footwear using discarded artificial hair for fashion purposes.

## Objectives of the Study

To fabricate a sample of a footwear using loosened artificial discarded hair in the studio.

## Significance of the Study

**Environmental Impact:** The research addresses the growing issue of waste generated from synthetic hair extensions, which are often discarded and contribute to the mounting problem of landfill overflow.

By proposing up-cycling as a solution, the study highlights a sustainable approach that can reduce environmental pollution and lessen the ecological footprint associated with the hair extension industry.

**Resource Utilization:** This study emphasizes the potential of utilizing discarded faux hair as a resource for creating new products, specifically footwear. By advocating for the transformation of waste into valuable items, it encourages innovative thinking and resourcefulness, promoting a circular economy approach where materials are reused rather than disposed of.

**Fashion Industry Innovation:** The findings could inspire designers and manufacturers within the fashion industry to explore alternative materials for their creations. By integrating up-cycled materials into footwear, the study opens up new avenues for creativity and sustainability in fashion, paving the way for more eco-friendly practices.

**Awareness and Education:** By drawing attention to the issue of hair extension waste and the benefits of up-cycling, this study educates consumers and industry stakeholders about the environmental challenges tied to faux hair usage. Increased awareness may lead to more conscious consumer behaviour and a demand for sustainable options.

**Contribution to Sustainable Practices:** The research contributes to the broader conversation on sustainability and waste management. By positioning up-cycling as a viable solution, it encourages other sectors to consider similar practices, thereby fostering a culture of sustainability across various industries.

**Economic Opportunities:** The potential for creating new products from discarded materials may also offer economic benefits. This study could lead to job creation in the areas of recycling, manufacturing, and design, presenting new opportunities for entrepreneurs in both the fashion and sustainability sectors. It also encourages innovation, resourcefulness, and sustainable practices within the fashion industry, making it significant on multiple fronts.

## LITERATURE REVIEW

This study reviewed some concepts, existing literature and theories relevant to the research topic. They are as follows: Synthetic Hair Extensions**,** History of Hair Extensions, History of wigs and braids, sustainability in fashion and theoretical framework.

## Synthetic Hair Extensions

Synthetic hair consists of man-made fibers. It is formed from polymers, giving it a similar look and feel to natural hair. However, unlike human hair, synthetic hair is not made from keratin. Instead, it is most commonly made from various man-made polymers and plastics (although it can also be made from natural polymers and cellulose (from banana and plantain fibres as well). It is often made from Polyethylene-terephthalate, PVC, Vinyl, Acrylonitrile, Acrylic, Single-filament polyester, Silk, Silicone, and nylon. While Human hair is a protein filament made out of keratin. It grows out of the hair follicles on the scalp and various other parts of the body (headcovers, 2019). The fibers are put through various chemical processes to give them a similar look, feel, color, and styling capability as human hair. The quality of the materials used to create the fibers is what determines how closely a bundle of synthetic hair mimics actual human hair. Unlike human hair, synthetic hair has no keratin. Man-made polymers used to manufacture synthetic hair are often combined with plastic. According to India times (2024), one of ways in which people add length and fullness to human hair is by using artificial hair integrations, more commonly known as hair extensions, hair weaves, and fake hair. Hair extensions are usually clipped, glued, or sewn on natural hair by incorporating additional human or synthetic hair.

These methods include micro/nano rings, fusion methods, weaving methods, and wigs. A hair weave is a human or artificial hair utilized for integration with one's natural hair. Weaves can alter one's appearance for long or short periods by adding further hair to one's natural hair or by covering the natural hair together with human or synthetic hairpieces. Weaving additional human or synthetic pieces can enhance one's hair by giving it volume and length, and by adding color without the damage of chemicals or by adopting a different hair texture than that of their own. However, hair loss can occur either along the front hairline above the ears due to the wearing of specific hairstyles, such as weaves, for a prolonged time. Such hair loss is known as *traction alopecia*. Hair extensions are part of some people's daily lives. They help people feel their best and change their appearance whenever they like. This study has observed that synthetic hairs have the same components with some synthetic fabrics such as: polyethylene-terephthalate, pvc, vinyl, acrylonitrile, acrylic, single-filament polyester, silk, silicone, and nylon. And as such, some of these mentioned are also used to fabricate some foot wears, therefore the inclusion of artificial hair in shoe-making helped to produce appropriate results.

## History of Hair Extensions

The Ancient Egyptians used their hair to symbolize social standing; for them, thick, long, voluminous hair was the ultimate goal. The Egyptians would wear wigs regularly, usually for special occasions like ceremonies and banquets. Wigs and hair extensions were worn by men and women alike,

and the demographic included Pharaohs, Queens, and politicians, among many other notable figures in Egyptian society. Ancient Egypt is thought to be the birthplace of the first-ever hair extensions. Egyptians would weave sheep's wool into their hair to create the length and volume needed to demonstrate their social standing. Ancient Egyptian hair represented a hierarchy of status, and the beautification process was treasured in upper-class communities. Ancient Egyptians braided wigs manufactured from human, vegetable fibres and sheep's wool. Wigs were adorned with hair beads and tassels, intricately braided, and often held with beeswax. Dyed with vivid colors and embellished with precious gems, ancient Egyptian wigs would be splashes of primary color against the sands of the desert landscape. Subsequently, the only individuals who could afford these luxuries were members of the higher classes, excluding male Pharaohs who usually sported cropped hairstyles and favoured elaborate headpieces instead. Despite the unattainable luxuries of wigs, working-class Egyptians took additional measures to ensure this standard of beauty was upheld. A female body from a working-class grave dated around 3500 BC had evidence of hair dye (henna was used to colour grey hair) and hair weaving (locks of human hair were tied to natural objects to produce an elaborate beehive hairdo). Archaeologists have intensely studied this period and have found many female remains with sheep's wool braided into their hair to extend its length and volume. This was incredibly important to the Ancient Egyptians, with hair being a key indicator of their social status and thick, full locks being the goal for most. Egyptians are also credited with inventing wigs (alchemist, 2021).

Queen Elizabeth I was known for her tall wigs and hairpieces, becoming a trendsetter after losing hair due to smallpox. She is believed to have owned over 80 hairpieces made from sheep's wool, similar to those used in Ancient Egypt. The wig trend escalated in the 17th century, with figures like King Louis XIII and King Louis XIV of France popularizing wigs as status symbols. By the 20th century, wigs became accessible to the general public, allowing for hairstyle experimentation. The '60s favored big hairstyles, while the '80s and '90s saw a rise in perming and hair extensions for volume and length. Over time, hair extensions evolved from royal exclusivity to widespread availability, continuing to be a staple in fashion. This ongoing popularity raises concerns about waste production, suggesting a need for re-cycling or up-cycling in the industry.

## History of wigs

A wig is a head covering made of real or artificial hair, used for various purposes, including theater, personal adornment, disguise, or religious significance. The practice of wearing wigs dates back to ancient times, with the earliest documented use around 3400 BC in Ancient Egypt. Wigs were worn by

Egyptians to shield against the sun, and other ancient civilizations like the Assyrians, Phoenicians, Greeks, and Romans also utilized artificial hairpieces. Initially, wigs represented social hierarchy rather than fashion statements, as shown by an archaeological find in Hierakonpolis from that era (Simon, 2024). In plate 1a, various displays of the ancient Egyptian wigs could be viewed.



**Plate 1a:** Various displays of the ancient Egyptian wigs. Photo: @Egypt. Culture on Facebook Source: UGC © Provided by Tuko. Source: https://www.msn.com/en-xl/africa/kenya/why-do-black-women-wear-wigs-their-history-and-significance-explained/ar-BB1hsIbj#

In the 1600s, the rise of syphilis in Europe led to visible symptoms like skin sores and patchy hair loss, prompting the use of wigs to conceal these issues. King Charles II of England, who exhibited common syphilis symptoms, adopted wigs for this reason (Encyclopedia Britannica). Additionally, wigs helped address the widespread problem of lice, as wearing them required shaving the head (lethbridgenewsnow 2023). By the 16th century, wigs became an accepted form of adornment, with men's periwigs gaining popularity after Louis XIV began wearing one in 1624. The wig industry was formalized in France by the formation of a wigmakers guild by 1665, making wigs a symbol of wealth, status, and occupation. While women also wore wigs, men's wigs dominated in the 17th and 18th centuries until social revolutions diminished their significance. Today, specific wigs remain as part of official attire in certain professions, particularly in the UK (European Fashion Heritage Association, 2022). For several centuries women continued to wear wigs and hairpieces, but only surreptitiously. The popularity of women's naturally styled wigs increased substantially in the 20th century, especially after the development of wigs made from inexpensive synthetic hairs. As a result, women became more open about the use of wigs as a fashion choice. Wigs also became acceptable head coverings for women in

some communities practicing Orthodox Judaism. In Asia, wigs have been used rarely except in the traditional theatre of China and Japan (Simon, 2024).

**History of braids**

Braids can be achieved using the natural hair or artificial hair attachments. Different hair styles were/are made with these. The origin of braids can be traced back 5000 years in African culture to 3500 BC. They were especially popular among women, and there is strong evidence suggesting that braiding originated in Africa. The earliest artistic depictions of braids have been found in the Venus of Willendorf, a 30,000-year-old female figurine found in modern-day Austria, and the cornrowed Venus of Brassempouy in France, estimated to be about 25,000 years old (Ngema, 2023). The earliest drawings of braids in Africa were discovered in Ancient Egypt dating back to 3500 BC, while Namibia's Himba people have been braiding their hair for centuries using red, pigmented strands to protect themselves from the sun. In many African tribes, braided hairstyles served as a unique way to identify each tribe, as braid patterns and hairstyles provided insight into a person's tribe, age, marital status, wealth, power, and religion. Braiding was not just a styling technique but also a social art, as it often involved socializing and bonding. The tradition of braiding was passed down through generations and eventually spread across the world, becoming most popular around the 1900s when braids were worn by almost all women, children, and even some men (Allen, 2023).

Ngema (2023) highlights the pivotal role of hair braiding in shaping identity, fostering community, and symbolizing beauty across cultures. African braiding traditions significantly influence contemporary beauty standards in Black and African communities. Braiding serves as a bonding practice, a showcase of skills, a marker of social status, and a way to preserve cultural heritage, even amidst migration. While traditionally associated with women, men also engage in braiding. In modern African society, it remains a valued tradition; for instance, in Sudan, young girls wear mushat braids, reflecting time spent with female elders and emphasizing femininity in cultural preservation. With historical roots tracing back to 3500 BC in East Africa, braiding practices vary, as seen in Somalia, where Islamic influences have limited traditional styles, though young women may adopt long, small braids during puberty.

Ngema (2023) mentioned that the Hamar tribe in Ethiopia uses elaborate hairstyles to indicate male worth and female marital status, using a mixture of fat, water, and red ochre for their dreadlocks. This tradition has historical roots in warrior culture. Other regions, like Eritrea and among the Oromo, Maasai, and Kikuyu tribes, also feature unique braiding styles that reflect identity and societal roles. In Tanzania, the Maasai are moving towards professional hairdressing for economic reasons. Additionally,

West Africa is known for diverse braiding styles that have shaped global Black culture, with the Fula people recognized for Fulani braids adorned with decorative elements symbolizing status. He also noted that Ghanaian braids, Ghanaian braids have gained popularity for their easy application, low maintenance, and protective benefits for natural Black hair. The advent of hair extensions has led to innovative styles of traditional cornrows, which signal religious beliefs and social status. This braiding technique dates back to hieroglyphics from around 500 BC. Similarly, Nigeria's rich braiding history is linked to the Nok culture, with artifacts showing a member of the Nok tribe with cornrows. Various Nigerian cultural groups, including the Benin, Igbo, Igbira, Fulani, Hausa, Miango, and Yoruba, have their own distinct braiding styles. Today, individuals enjoy the freedom to choose any braided hairstyle they like. Ghanaian braids are popular for their ease and protective benefits for natural hair, with roots tracing back to ancient hieroglyphics. The use of hair extensions has led to innovative cornrow styles that signify social status. Nigeria also has a rich braiding history linked to the Nok culture and various ethnic groups like the Igbo and Yoruba. Plate 1b, showcases a modern Igbo girl with long braids made with artificial hair attachment. Today, people can freely choose their preferred braided hairstyles.

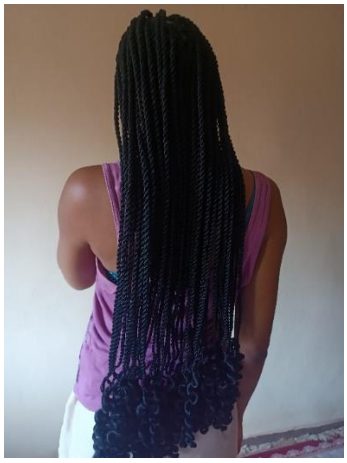


**Plate 1b**: An Igbo girl in Braids with artificial hair. Source: chudi-duru (2024).

Ngema (2023) highlights the profound impact of the Trans-Atlantic Slave Trade on the identity and culture of West Africa. Enslaved women developed communication networks through cornrows and specific braiding techniques as a response to their circumstances. By the 15th century, tribes like the Wolof, Mende, Mandingo, and Yoruba began using distinct braid styles to convey messages. The Dogon tribe's legacy in Mali exemplifies the adherence to traditional practices in hair braiding. In Sierra Leone, Mende people's braided hair symbolizes femininity and is intricately styled to reflect beauty, attractiveness, and mental well-being.

Senegal's Senegalese Twists, or "Rao", gained popularity as a unique method for creating long, individual braids, originally using dried vegetable fibers called Yoss before the advent of artificial hair extensions. Gambian warriors wore tightly coiled braids during battles. The Mangbetu people of the Democratic Republic of Congo were known for their distinctive elongated skulls, shaped from infancy through a practice called Lipombo, with braids styled into a crown called edamburu, symbolizing beauty and status. In Cameroon, the Fulani community popularized Bantu knots, which are significant in representing identity in Uganda. In Chad, Basara Arab women are recognized for their long, thick braids, maintained using traditional chebe powder. In Angola, young girls learn to braid as a key aspect of woman hood (see plate 2).



**Plate 2**: Portrait of a Mumuhuila teenage girl, Huila Province, Chibia, Angola on December 4, 2010 in Chibia, Angola. Photo by Eric Lafforgue/Art in All of Us/Corbis via Getty Images

The origins of Bantu knots can be traced back to the Bantu people across central and Southern Africa, a term used by colonialists to describe over 400 culturally similar ethnic groups (Ngema, 2023). Southern Africa is home to a variety of indigenous braiding styles, with Namibia's Himba people being well-known for their traditional hair maintenance methods. They utilize different braiding styles, including dreadlocks, to signify various phases of life. Upon reaching puberty, they create long dreadlocks and apply a mixture of goat hair, red ochre paste, and butter to promote the growth of healthy, long hair (Ngema, 2023).

The Mbalantu women who reside near the southern tips of Angola and the northern border of Namibia are known to still keep their tradition of growing very long naturally coarse hair that famously goes down to their thighs. The Mbalantu women of Namibia were in the 1900s well-known for their incredibly long, braided hair. It is said that the length of the hair was so important to these women to the extent

that some of them had to buy hair from other women to attach to their own**.** The country's Mbalantu tribe uses embuvi braids as an initiation into womanhood. Animal fat and grounds of the omutyuula tree have young women achieving ankle-length braids by the time they hit puberty. They cover their hair in a homemade mixture that keeps their hair moisturized and lubricated which is why their hair never breaks; even from childhood. These unique braids have since become an inspiration for celebrities across the world. An Mbalantu girl with her natural braided hair could be viewed in plate 3 below.



**Plate 3**: An Mbalantu girl. Source: https://ibiene.com/culture/the-secret-behind-the-long-hair-of-the-mbalantu-women/

The "Zulu Knots" in South Africa are believed to be the original form of this hairstyle, worn by individuals of the Zulu Kingdom to represent strength and unity. In African culture, these raised knots held spiritual significance as they represented the highest point of the body. Additionally, South Africa is recognized for originating "Box braids," with historical evidence of this style dating back to 3500 BCE. Affording this hairstyle indicated significant wealth, achievements, and social status (Byrdie, 2023).

Expressions and styles have changed, but braiding patterns have remained the same. Braiding the hair with synthetic hair has come to stay. In today's culture, braids are adorned, worn, admired and praised in different ways. Men and women who wouldn't have worn them previously now embrace them. Women are approaching the braiding style in different ways. From clean lines to braids that are organic and messy (Allen 2023). This analysis underscores the historical integration of the practices of wearing wigs and braiding hair within human fashion, which persistently evolves. The widespread adoption of artificial hair extensions has spawned a burgeoning array of attachments designed to fulfill diverse demands. However, this has also catalyzed a surge in discarded hair extensions, prompting the need to explore sustainable management of this waste. Consequently, this study up-cycled discarded artificial

hair extensions sourced from the environment into reusable items like slippers and purses, aligning with the imperative to foster environmental stewardship.

**Sustainability in fashion**

Enterprises in the fashion industry that reduce societal harm, safeguard the rights of apparel workers, and ensure animal welfare are collectively referred to as sustainable fashion. This paper is concerned with alleviating the effects on the environment. Interest in fashionable products that reflect these ideals is rising along with the world's understanding of environmental responsibility. Over the last ten years when fashion has steadily gained prominence in that major changes in the sector from post-consumer use to packaging methods has been achieved. Among other innovative repurposing ideas, up-cycling of apparel and trendy materials have recently extended to include converting dresses into table mats, jackets into slippers, shirts into caps and belts, and pants into skirts and others.

The fashion industry wields considerable harm on the environment, as one of the considerable contributors to pollution worldwide and ranks second only to the oil sector. Being responsible for approximately 20% of global industrial water pollution. This study has observed that, a sizable amount of clothing is made of plastic, which adds to the possibly catastrophic micro-plastic problem. Additionally, it has been noted that the thousands of dangerous chemicals used in textile mills provide serious risks to both the environment and the health of those who handle these materials. This fact highlights how urgently the industry has to undergo a comprehensive transformation toward sustainable fashion. Due to the fact that fast fashion has given rise to a culture of frugality, this has enabled the consumers to differentiate between cheap apparel and fashion accessories like hair attachments. Consequently, a significant amount of these abandoned items that have no secondary market value end up in landfills, which produces carbon dioxide emissions. Fashion companies may differentiate each other from the competition, attract a larger range of customers, and drastically reduce their environmental impact by using sustainable practices.

According to Apparel Entrepreneurship (undated), the sustainability of fashion brands can be enhanced through their operations and various strategies. For instance: engaging sustainable materials, water consumption should be reduced during production, making use of natural dyes, and the wastes should be curtailed by repurposing excess materials for substitute products or investigating recycling and up-cycling opportunities. When these practices are implemented, they can lead to environmental impact reduction while also saving some costs. Additionally, ethical labor practices should be focused on by fashion brands who will ensure that their supply chains are managed in a proper and sustainable manner, ensuring just treatment of workers and the provision of living wages. This approach is not only

a moral imperative but also has the potential to elevate the brand's reputation. Moreover, it is recommended that companies invest in renewable energy sources, such as solar or wind power, to decrease their carbon footprint. Such investments can mitigate the environmental impacts of operations and result in significant savings on energy costs.

To effectively educate consumers regarding the sustainability of their products, fashion brands should collaborate with like-minded enterprises committed to sustainable practices, as highlighted by Apparel Entrepreneurship (undated). In addition it is crucial to support fair trade and sustainable initiatives. They should focus on them continuously, with the view that sustainability is an evolving process. Evaluation and enhancement of sustainability practices often is very important, to identify opportunities which will further reduce environmental impact. Furthermore, the use of recycled and biodegradable materials are encouraged. Incorporating recycled inputs, such as repurposed plastic or fabric, can substantially lessen environmental impact and divert materials from landfills. Implementing energy-efficient practices within production processes, including the use of led lighting and high-efficiency equipment, can also help decrease both energy consumption and operational costs while minimizing environmental effects. Apparel Entrepreneurship (undated) emphasizes the importance of partnerships with sustainable organizations and agencies, such as charities and non-profits. Such collaborations enable fashion brands, including those involved in artificial hair manufacturing, to extend their positive impact beyond their operations and align their missions with significant social causes. Additionally, engaging with design agencies that prioritize sustainability can facilitate the implementation of sustainable practices. By adopting these sustainable strategies, fashion brands can not only mitigate their ecological footprint but also differentiate themselves from competitors and attract a wider customer base. Commitment to sustainability fosters stronger relationships with consumers, aids in attracting and retaining top talent, and ultimately contributes to business success.

In a landscape dominated by fast fashion, prioritizing sustainability constitutes a significant and impactful decision. By engaging in mindful shopping practices, endorsing eco-conscious brands, exploring second-hand goods, and creatively embracing up-cycling topics explored in this paper, individuals can contribute positively to both environmental preservation and community well-being. According to Apparel Entrepreneurship (undated) even minor actions are meaningful, and collectively, these efforts can foster a more sustainable future for the fashion industry. Thus, one can express personal style while simultaneously demonstrating respect for the planet and its inhabitants. This study rigorously investigates methods for up-cycling discarded artificial hair found in the environment to

effectively mitigate environmental damage. Some samples of artificial hair that were condemned after use are placed in plates 4 and 5.




**Plate 4**: artificial hair attachment and braided hair. Source: Chudi-Duru (2024). These artificial hair are used in braiding the hair. They usually come in very long length before they are cut to the desired length. Majority of the females that braid their hair always prefer long lengths (shoulder length, brassier length, and hip length) probably because such length is in vogue.



**Plate 5:** artificial hair attachment and braided hair styles. Source: Chudi-Duru (2024).



Plate 5b: artificial hair attachment of different colours. Source: Chudi-Duru (2024)

**Environmental gains of the study**

The up-cycling of discarded faux hair into fashionable footwear presents several significant environmental gains:

**Reduction of Landfill Waste**: One of the primary environmental benefits is the direct decrease in the volume of synthetic waste that ends up in landfills. By repurposing faux hair, the study aims to minimize the accumulation of non-biodegradable materials that can contribute to long-term environmental pollution.

**Conservation of Resources:** Up-cycling reduces the need for new raw materials in the manufacturing of footwear. This conservation of resources can lead to decreased demand for synthetic fibers, which require energy and raw materials to produce. By using existing waste materials, the environmental burden associated with resource extraction and processing is lessened.

**Lower Carbon Footprint**: The production process for new synthetic materials often involves considerable carbon emissions. By transforming discarded faux hair into footwear, the study promotes a lower carbon footprint associated with the production cycle, including reduced energy consumption and $CO_2$ emissions from manufacturing.

**Promotion of Circular Economy**: This initiative supports the principles of the circular economy, which advocates for resource efficiency and waste reduction. By emphasizing reuse and up-cycling, it encourages a system where materials are kept in circulation for as long as possible, ultimately reducing the overall environmental impact.

**Awareness and Education**: The implications of this study can foster greater awareness of the environmental issues associated with synthetic materials in fashion. Increased consumer knowledge can lead to more environmentally conscious choices, encouraging sustainable practices across the industry.

**Biodiversity Preservation**: Reducing the volume of waste sent to landfills helps minimize the potential for land degradation and habitat destruction associated with landfill expansion. By up-cycling, the study contributes to the preservation of biodiversity by promoting practices that are less harmful to ecosystems.

**Encouragement of Sustainable Practices**: The study can inspire other sectors within the fashion and textile industries to explore similar sustainable practices. This shift towards more environmentally friendly production methods can lead to broader positive impacts on the environment.

**Innovation in Materials**: Exploring the potential of up-cycling faux hair can drive innovation in the use of sustainable materials. It encourages the development of new materials from waste, leading to a

reduction in dependency on virgin resources. In summary, the environmental gains from up-cycling discarded faux hair into footwear are substantial. This initiative not only addresses waste management issues but also promotes sustainable practices that contribute to the well-being of the planet.

## Theoretical Framework

When analyzing sustainable fashion such as up-cycling discarded artificial hair extensions in the built environment into reusable items for fashion purposes, several theories were effectively utilized to gain a deeper comprehension. One prominent theory is the cradle-to-cradle design concept, which is based on creating products that can be fully recycled or biodegraded after use, thus minimizing waste in the long term. In their 2002 book Cradle to Cradle: Remaking the Way We Make Things, Architect William McDonough and chemist Michael Braungart presented an integration of design and science that provides enduring benefits for society from safe materials, water and energy in circular economies and eliminates the concept of waste. Relating this theory to this study, it argues that by up-cycling discarded hair extensions into new fashion items, one can reduce the environmental impact of the fashion industry and promote a more circular approach to textile production.

Another important theory is the concept of ethical fashion, which includes garment design, production, and distribution that focuses on reducing harm to people and the planet. It advocates for environmentally friendly and socially responsible practices in the fashion industry. Ethical fashion emphasizes the importance of using sustainable materials and production methods, as well as ensuring fair treatment of workers throughout the supply chain. By up-cycling discarded hair extensions, designers can contribute to the ethical fashion movement by reducing the demand for virgin materials and minimizing the industry's overall environmental footprint.

Furthermore, sustainable fashion often draw inspiration from the principles of sustainable development, which emphasize the need to meet present needs without compromising the ability of future generations to meet their own needs. By up-cycling discarded hair extensions into reusable fashion items, artists and designers can demonstrate a commitment to sustainable development by repurposing materials that would otherwise contribute to landfill waste. Presented below are some samples of artificial hair and hair weaves.

## Empirical Framework

The empirical framework for this study is designed to guide the research process and serve as a foundation for analyzing the relationship between the up-cycling of discarded faux hair and the creation

of fashionable footwear. The framework encompasses various components, including theories, conceptual framework, and methodological approaches that will facilitate the investigation. This study is rooted in the principles of the circular economy, which emphasizes reducing waste by reusing materials and resources. By focusing on up-cycling faux hair into footwear, the research aligns with sustainable practices that promote environmental responsibility. This theory highlights the necessity for the fashion industry to adapt to sustainable practices. It encourages the exploration of alternative materials and production processes that minimize environmental impact. The study examined how up-cycling faux hair can contribute to this movement. The conceptual model for this research can be illustrated as follows:
**Input:** - Discarded faux hair (synthetic fibers). Process - Up-cycling techniques (weaving, sewing, etc.). Output - Fashionable footwear made from up-cycled materials. Outcome - reduction of waste in landfills and promotion of sustainable practices in fashion.

## METHODOLOGY

This is qualitative research and the research design is studio exploration. It made use of primary and secondary sources of data. The primary sources of data were the studio experiments and observations while the secondary were books, journals, magazines and internet sources. This study also utilized photographs and observations as research instruments to collect some data. Some discarded artificial hair attachments were collected from some hair salons, and they were washed, disinfected and dried. They were further sorted and arranged to be utilized in weaving. A simple frame loom was employed. A plain weave was the type of weave used to produce the sample of the fabric during the studio experiment.

### Population of the Study

Population may be defined as the total number of units (individuals, organizations, events, objects, or items) from which samples are selected for measurement. A population is the entire group that you want to draw conclusions about. In research, a population doesn't always refer to people. It can mean a group containing elements of anything you want to study, such as objects, events, organizations, countries, species, organisms, etc.(Bhandari,2020). The population of this study is the discarded synthetic hair attachments found during this study which are the items utilized during studio exploration**.**

### Sample size

A sample is the specific group that you will collect data from. The size of the sample is always less than the total size of the population (Bhandari, 2020). Since most of the synthetics made from plastic

fibres are of the same texture and components but of different colours, two were chosen to conduct this weaving experiment in the studio. The studio results were thereafter generalized.

## Studio Exploration

### Stage one-gathering of studio materials for the exploration

During this study, the researcher utilized various discarded artificial hairs with a mixture of acrylic yarn to produce some samples of footwear during the studio practice. There was experimentation on using a simple frame loom to weave a piece of fabric using the synthetic hair collected from the field. The acrylic yarns were used as the warp and some of the weft while the artificial hair was utilized as the major filling during the process of weaving. During the studio practice, a sample of woven fabric was produced and utilized to produce a sample of slippers. The materials used during the studio exploration are a simple wooden frame loom, synthetic hair, acrylic yarns of different colours, and a hair comb, shoe last, evo-stick, shoe padding, hammer, and shoe sole, a pair of scissors, painters brush, and lighter for the burning of some of the artificial hairs that were sticking out. The studio process is divided into parts. The first is the weaving section while the second is the fabrication of a pair of slippers with the woven fabric. The studio practices are hereby recorded below.




**Plate 6a**: tools for producing footwear in the studio, acrylic yarn of various colours, discarded artificial hair. Source: Chudi-Duru (2024). Different types of artificial hair could be used to achieve the result of this research.

## Stage two - sorting and washing of the used trashed artificial hair





**Plate 6b**: discarded cut out braided artificial hair, disinfected, washed and dried. Source: Chudi-Duru (2024). The artificial hair was washed to get rid of any dirt that must have accumulated when used and dumped. It was also disinfected for sanitation purposes, than sundried to get it ready for weaving.



**Plate 6c**: discarded cut out braided artificial hair disinfected, washed and dried. Source: Chudi-Duru (2024).

## Stage three- Weaving section




**Plate 7a**: simple frame loom with one inch nails at the opposite ends. Source: Chudi-Duru (2024). Plate **7b**: warping with acrylic yarn. Source: Chudi-Duru (2024). This simple frame loom was used to produce a plain woven fabric that was utilized in this study. This was just a studio exploration.



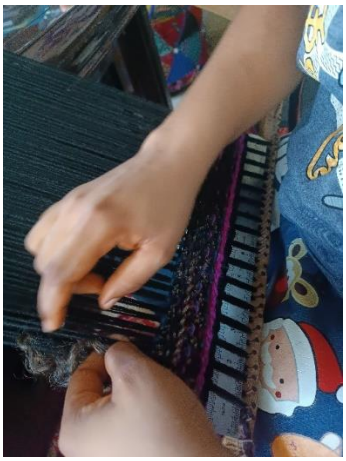


**Plate 8a**: warped loom. Source: Chudi-Duru (2024). **Plate 8b:** weaving commences. Source: Chudi-Duru (2024). The acrylic yarn was used to do the warping on the frame loom. Warp in a loom is a set of yarns that are stretched and wound onto the loom before weaving.



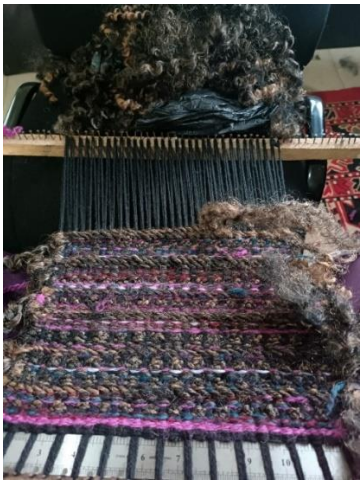


**Plate 9a**: weaving in progress. Source: Chudi-Duru (2024) **Plate 9b**: almost nearing completion. Source: Chudi-Duru (2024)



**Plate 10**: weaving completed. Source: Chudi-Duru (2024)



**Plate 11**: woven fabric being neatened with a source of heat after cutting off from the frame loom. Source: Chudi-Duru (2024)

## Stage four - shoe making section

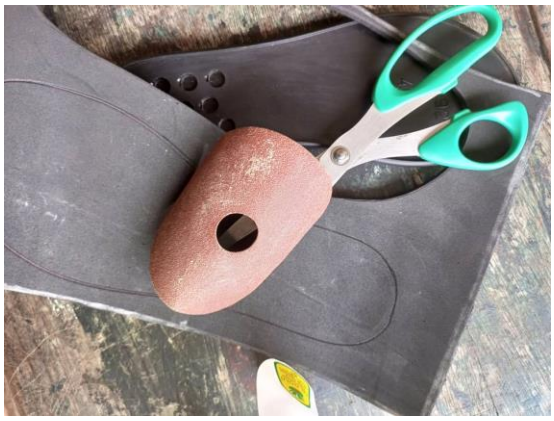


**Plate 12**: the sole has been measurement on the shoe pad ready for cutting. Source: Chudi-Duru (2024). It will be sand papered to achieve a smooth finish.





**Plate 13**: the shoe pads were stuck to the smoothened leather and plain black leather. Source: Chudi-Duru (2024)





**Plate 14:** after gumming, they are cut to shape. Source: Chudi-Duru (2024)





**Plate 15:** the pattern of the upper is placed on the fabric and cut. Source: Chudi-Duru (2024).



**Plate 16**: the evo-stick is applied on the upper woven fabric and left to dry a bit. Source: Chudi-Duru (2024).





**Plate 17**: the slightly dried fabric is fixed to the padding using the last as a fitting. Source: Chudi-Duru (2024)





**Plate 18(left):** the fitted woven fabric fitted on the last. Source: Chudi-Duru (2024).

**Plate 19(Right)**: pair of slippers (prototype) made with a hand woven material made of discarded artificial hair and acrylic yarn. Source: Chudi-Duru (2024)

## RESULT, DISCUSSIONS AND FINDINGS

During this study, discarded synthetic hairs with a combination of acrylic yarns were found to be appropriate for weaving a fabric suitable for shoemaking. The fabric produced was found to be sturdy and able to withstand stress, it does not retain water and can easily be washed and dried if found dirty. The slipperiness of the attachment could be controlled by using a lighter to stop the edges from

fraying. And also the hairs that were sticking out after the weaving were burnt off using the lighter. The studio exploration result is the pair of slippers produced.

Employing the cradle to cradle design concept, it can be seen that in this study, artificial hairs were truly up-cycled after they have left the human hair to produce something useful. In this context, all the components of the synthetic product fed another product which is the slippers produced, they are composed of technical components that continually circulate as valuable materials for the industry. It could be argued that cradle to cradle is equivalent to true sustainability – through the technical components used, all products become sustainable as nothing becomes waste which cannot be reused. The concept of ethical fashion, which includes garment design, production, and distribution focuses on reducing harm to people and the planet and advocates for environmental friendliness. Employing this concept in this study, shows that instead of sending the used synthetic hairs to the landfills to pose some health challenges to the environment, they were up-cycled in the studio to produce some wearable fashionable footwear which is a pointer to environmental friendliness.

Overall, the theories for analyzing sustainable textile art and the up-cycling of discarded artificial hair extensions into reusable fashion items are rooted in the principles of environmental responsibility, ethical production, and sustainable development. By embracing these theories and the ideas put forward by their proponents, designers can contribute to a more sustainable and eco-conscious fashion industry. Below in figure 20 is the studio exploration result.



**Plate 20**: Studio exploration result: a fashionable item (prototype) produced by weaving up-cycled discarded hair attachment and acrylic yarns in a simple frame loom. Source: Chudi-Duru (2024)

## CONCLUSION AND RECOMMENDATIONS

From time immemorial, artificial hairs and braiding of hair have been part of human dress which cannot be ignored. As the days go by newer styles emerge. The usage of artificial hair/attachment has become universal in that people utilize them almost every time. More attachments will always be produced by various companies to meet people's needs. As more are produced, more are discarded after usage. The need for up-cycling cannot be ignored because the negative effects when sent to the landfills are quite disturbing. Hence the up-cycling of discarded artificial hair extensions found in the built environment into reusable items like slippers for fashion purposes was achieved to create an awareness that instead of sending them to the landfills they could be up-cycled. This research only produced a prototype of a pair of sandals to prove that up-cycling of discarded fake human hair can be woven like other materials used in weaving and used to create some reusable items instead of sending them to landfills. Two colours of attachments only were utilized in this study, artificial hair attachments come in various colours, and these can also be experimented with to produce more varieties. This production can be done on a larger scale. Sophisticated looms and machines can also be incorporated into washing and disinfecting the used attachments, weaving, and cobbling to produce more pairs of slippers that could serve many people. This fabric woven could also be combined with other fabrics in clothing construction for apparels in fashion design. Collection centers can be set up in different locations to collect the used attachments so that much of it can be assembled. Users could also be sensitized on the need to drop used attachments in the collection centres instead of the dustbin which will eventually be dumped in the landfill.

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