

ARAŞTIRMA MAKALESİ (Research Article)

Innovative Apparel Design fix for Plus-Size Women in Ghana Gana'daki Büyük Bedendeki Kadınlar İçin Yenilikçi Giysi Tasarımı Çözümü

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ABSTRACT

This study utilized the apparel design framework to develop innovative designs catering to the specific needs of plus-size Ghanaian women. Design serves as the foundational element for all products, including those in the fashion industry, as it involves the systematic creation and strategic organization of elements to achieve a desired purpose or aesthetic result. Adopting a qualitative research approach, the study engaged twenty-four (24) plus-size women in three (3) focus group discussions. Their valuable insights informed the creation of three (3) prototype designs. These prototypes were produced, worn, and assessed by a group of five (5) consumers to evaluate effective concealment of figure orientation, promotion of illusionary aesthetic appeal, and optimal fit. The findings suggest that plus-size women faced significant challenges in finding apparel that aligned with their preferences and were suitable for their figure type. The study demonstrated that incorporating innovative elements like style lines and color offered viable apparel options that catered to the requirements of this demographic. The study concluded that apparel retailers and designers should acknowledge the market potential of the plus-size sector and ensure a diverse range of sizes and styles is accessible. Furthermore, implementing initiatives that foster body positivity and boost self-confidence such as awareness campaigns, inclusive fashion shows, and diverse media representation is imperative.

ÖZ

Bu çalışma, büyük beden Gana'lı kadınların özel ihtiyaçlarını karşılayan yenilikçi tasarımlar geliştirmek için giyim tasarımı çerçevesini kullandı. Tasarım, istenen bir amaca veya estetik sonuca ulaşmak için öğelerin sistematik olarak oluşturulmasını ve stratejik organizasyonunu içerdiğinden, moda endüstrisindekiler de dahil olmak üzere tüm ürünler için temel unsur olarak hizmet eder. Nitel bir araştırma yaklaşımını benimseyen çalışma, yirmi dört (24) büyük beden kadını üç (3) odak grup tartışmasına dahil etti. Onların değerli görüşleri üç (3) prototip tasarımının oluşturulmasına bilgi sağladı. Bu prototipler, figür yöneliminin etkili bir şekilde gizlenmesini, yanıltıcı estetik çekiciliğin teşvik edilmesini ve optimum uyumu değerlendirmek için beş (5) tüketiciden oluşan bir grup tarafından üretildi, giyildi ve değerlendirildi. Bulgular, büyük beden kadınların tercihlerine uygun ve vücut tiplerine uygun kıyafetler bulma konusunda önemli zorluklarla karşılaştıklarını gösteriyor. Çalışma, stil, çizgiler ve renk gibi yenilikçi unsurların bir araya getirilmesinin, bu demografinin gereksinimlerini karşılayan uygun giyim seçenekleri sunduğunu gösterdi. Çalışma, hazır giyim perakendecilerinin ve tasarımcılarının büyük beden sektörünün pazar potansiyelini kabul etmesi ve çok çeşitli beden ve stillerin erişilebilir olmasını sağlaması gerektiği sonucuna vardı. Ayrıca, bilinçlendirme kampanyaları, kapsayıcı defileler ve çeşitli medya temsilleri gibi vücut pozitifliğini teşvik eden ve özgüveni artıran girişimlerin uygulanması zorunludur.

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Introduction

The future prospects for the global textiles and clothing trade may face significant challenges due to a decelerating world economy and weakened consumer demand (Başer, 2024), post covid era (Lu, 2022). Particularly noteworthy is the consensus among leading international economic institutions, including the World Bank and the International Monetary Fund (IMF), that the global economy will experience a slowdown (IMF, 2023). Additionally, the World Trade Organization (WTO) predicts a reduction in the growth of global merchandise trade to 3.5% in 2022, further declining to just 1% in 2023 (WTO, 2022). Consequently, the textiles and clothing trade worldwide is likely to encounter stagnant growth or a modest decline in the next two years (Lu, 2022). Therefore, companies operating in this industry should devise strategies to navigate the impending difficulties, with one effective approach being the adoption of innovation by apparel enterprises.

Today's consumer is becoming increasingly discerning and sophisticated. They now have access to a wide range of affordable products and can make selective choices (Sawyerr, 2019). Adding to the challenge, consumers are allocating less of their disposable income towards apparel, opting instead to spend on healthcare, electronics, education, and travel & leisure activities (Oliveira, Garcia & Naas, 2026). To attract and engage this elusive consumer, innovation has become more crucial than ever. Recent advancements in fabric and garment finishing technologies are injecting excitement into ordinary products. There are multiple reasons for enhancing the value of a product. The most apparent ones include rejuvenating sales, commanding a premium price, and setting the product apart from the abundance of alternatives in the market (Berg & Amed, 2020). However, less apparent yet equally important is that retailers and renowned brand labels view unique products as a prime means to expand and diversify their offerings (Wang, 2022). This demonstrates that leveraging innovative techniques is essential for maintaining a consistent and profitable business. Innovation is the process through which an idea or invention is transformed into a desirable good or service for which people are willing to pay (Baskara, & Mehta, 2016). It involves purposefully applying knowledge, creativity, and initiative to extract greater or different value from resources. It encompasses all the processes by which new ideas are generated, converted into practical products, and successfully brought to market (Costello & Prohaska cited by Lakatos et al., 2016).

In recent times, there has been a noticeable increase in people's fashion consciousness. Regardless of size, age, or other factors, everyone desires to look stylish and fashionable. It is natural for individuals to want to feel good about themselves and present themselves in a great way. This growing fashion consciousness has led to the emergence of the plus-size clothing market, which is substantial in size. Plus-size fashion generally refers to clothing that ranges from size 14 up to as large as 72 ((Bogenrief cited by

Christel & William, 2018). However, there are relatively few designers, manufacturers, and retailers who actively engage in the production, marketing, and sale of plus-size garments. Throughout the history of mass production of women's clothing, there has been a limited offering for women who fall into the category of being "above average" in size, in comparison to the proportion of the population that fits into this size range. Consequently, consumers within this segment have often felt underserved (Kim & Yang, 2024).

According to Zhang, Ikonen & Eelen (2025), the plus-size business is often considered as a secondary concern, receiving less attention in the apparel industry. Despite statistics and experts indicating the profit potential of the plus-size market (Christel & William, 2018), designers and retailers remain uncertain about catering to this segment. Shelton et al. (2023), state that popular retail chains removed larger sizes from their physical stores, opting to sell them exclusively online. Other retailers, who offer larger sizes in-store, limit the available choices to a narrow selection of colors and patterns that are inconsistently distributed across their stores. This shows that stakeholders in the fashion industry acknowledge the ongoing frustration experienced by plus-sized shoppers who face limited options from mainstream marketers.

Wardrobe challenges experienced by women who wear plus-size clothing are not new (Moyo & Chisin, 2024). Fashion researchers have examined this niche market's clothing needs with reference to body shape and sizing (Jais & Shariff, 2025), style preferences of female adolescents (Romeo and Lee, 2015) and specialized categories such as exercise wear (Christel et al. 2016) and swimwear (Christel and O'Donnell, 2016). According to Tullio-Pow et al., (2021), there is a critical disparity in the Canadian fashion market, arguing that despite a proliferation of retail offerings, women in the upper plus-size category (size 20+) encounter a severely constrained selection of stylish and well-constructed apparel, a deficit that contributes to their social and economic marginalization. In a study comparing the perceptions and market development of plus-size fashion in Northern and Southern Europe, using the United Kingdom and Greece as representative case studies by Papadopoulou and Bazaki (2019), the found out that the plus-size fashion market was more developed and accepted in Northern Europe. In the UK, major high-street brands (e.g., ASOS, H&M, River Island) have extended their lines to include "curvy" ranges, often integrated with standard sizes. In contrast, Southern Europe showed a significant lack of plus-size options. Brands were scarce, often "plus-size-only," and promotional campaigns were minimal or non-existent. In the United States of America findings from research by Christel & William, (2018) using the Social Identity Theory indicate that plus-size consumers "out-group," wish to be identified with the inclusive, mainstream "in-group" (simply "Women") rather than being categorized by a size-based label that carries negative stereotypes. The media's representation of plus-size bodies was improving but remain limited. Ultimately, plus-size identity was formed under the constant pressure of the "thin ideal." (Christino, Paula, & Ferreira,

2023). The findings indicate that realizing the plus-size market's potential is contingent upon the deconstruction of weight based stigma within societal structures, including media, retail, and academia.

Consequently, there is a pressing need to meet the demands of consumers falling within this category. Iconic fashion marketers strive to create innovative and influential trends that align with the vaguely defined spirit of the times. Ideally, these creations should be embraced and adopted by specific consumer segments, becoming desired objects for a wider audience (Diedrichs, 2016). Unfortunately, the wants and needs of consumers have often been overshadowed by the artistic vision of designers. Given the pervasive stigmatization of larger bodies (Christel & William, 2018), it is not surprising that marketers in this aesthetically focused industry tend to overlook consumers whose bodies are deemed unattractive by societal standards. Therefore, this study seeks to utilize the apparel design framework proposed by Lamb and Kallal (1992) to develop innovative garment designs catering to the specific needs of plus-size Ghanaian women. To address this gap, this study first employed focus groups to identify key design preferences. Subsequently, it developed and tested a series of prototypes based on those findings, evaluating the prototypes for fit, comfort, aesthetic values and functional ranging from casual to smart casuals.

Methodology

The study employed a qualitative research design. Seven fashion homes were randomly chosen to determine the largest size available in their stores. Furthermore, a purposive sampling technique was used to select twenty-four (24) plus-size women as participants for three separate focus group discussions (FGDs). The FGDs aimed to gather insights from consumers regarding their preferences for ideal apparel. The eligibility criteria for FGD participants included; being 18 years or older, female, and meeting the definition of plus size according to Bogenrief cited by Christel & Dunn, (2018). The FGDs were done at there different locations with each each group consisting of a maximum of 8 people. The conceptual apparel design framework developed by Lamb and Kallal (1992) as seen in Fig, 1, was adapted as the foundation for producing the apparel, as it was considered the most suitable design framework according to Ramirez (2014). It is an integrated design framework that adopts a problem-solving methodology and incorporates functional, expressive, and aesthetic (FEA) principles. The central element of this model is the intended user, referred to as the target customer. To initiate the design process, the designer needs to develop a comprehensive profile of the user, encompassing their demographics, psychographics, physical attributes, activities, preferences, and other relevant information essential for creating the product. In the context of this model, the product in focus is an apparel for plus size women. Various fabrics, such as Woodin, Chiffon, and fancy prints, were chosen based on the fabric

decision maker (2022), which assists designers in selecting appropriate fabrics based on variables such as garment type. As suggested by Sidhu et al., (2021), bright colors like pink, orange, yellow, and red were used, as they can help conceal plus sizes and create a slimmer appearance. The final apparel designs were fitted on a model to assess their comfort, suitability, and acceptance among plus-size consumers as stated by the Apparel design framework. The design process followed a co-design framework, iterating through conceptualization, prototyping, and evaluation phases. Initial concept ideation was visualized through mood boards collated in Adobe Illustrator, establishing a cohesive thematic direction inspired by [e.g., Ghanaian cultural motifs]. Technical flat sketches, created in CorelDRAW, provided precise specifications for pattern drafting.

Patterns were developed digitally using Optitex, graded according to the ASTM D5585-11 standard for sizes 18-28. Fabric selection prioritized natural, breathable fibers like cotton and linen since the study is situated in the tropics where breathability of fabrics as a unique property is required. Garments were constructed using industrial straight stitch and overlock machines, with techniques like topstitching employed for structure. The evaluation phase was integral. Prototypes were first fitted on a standard size mannequin and a live fit model, assessing for fit, comfort, and design integrity. Subsequently, a user panel of five (5) plus-size Ghanaian women wore the prototypes for a day and provided structured feedback on practicality, suitability and wearability. This user-testing feedback directly informed design revisions, such as adjusting necklines and seam placements, ensuring the final outcomes were both aesthetically grounded and functionally robust.

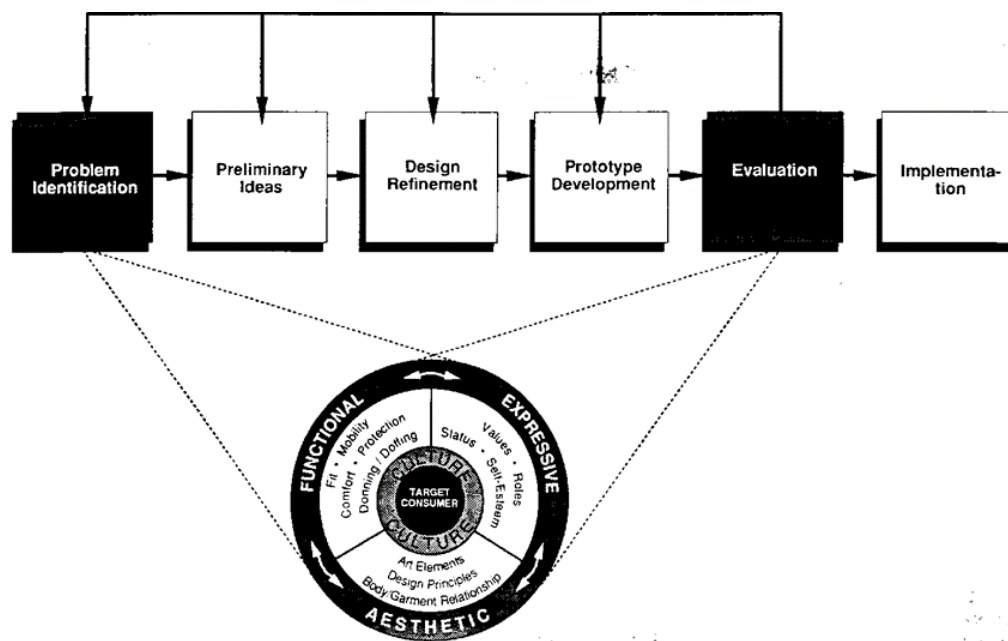


Figure 1. Apparel Design Framework (Lamb and Kallal, 1992)

Results and Discussions

Problem Identification

According to Ibanga (2017), there is a perception that a true African beauty is characterized by being big and beautiful. Being skinny is not considered African enough, and it is often assumed that a skinny female does not eat enough. The ideal Ghanaian girl is described as plump or fat, with large breasts, a prominent buttock, and glowing ebony skin. Many individuals meet these criteria, however, there are many others who also do not fit the description above and this include plus size women. The purpose of this design process was to produce apparels that meet the specification of plus size Ghanaian women. At the 2014 Vodafone Ghana Music Award, a lady as shown in figure 2. was labeled the worst dressed attendee. It was a night of glamour and elegance, and everyone aimed to wear the best outfit for the cameras and lights, as it only happens once a year. Surprisingly, this lady appeared to feel more comfortable in her chosen dress than anyone else. Many people criticized her attire and ranked her as the worst dressed at the event. In a subsequent media interview, (Debrah, 2014) she explained that she couldn't find the perfect dress and thought her choice was acceptable. However, her opinion did not align with the majority, as evidenced by the comments on social and print media as well as television. This lady is not alone in her struggle to find the perfect dress. There are many plus-size women like her who face challenges in finding clothing that fits well at regular clothing stores.



Figure 2. Worst Dressed VGMA, 2014 (*Ameyaw Debrah, 2014*)

The study included a visit to several well-known clothing stores in order to determine the largest size available in their inventory. To maintain confidentiality and anonymity, the store names were not disclosed and instead, numerical codes were used. This approach was implemented to protect the privacy of the participating stores, which willingly agreed to take part in the research. Stores were selected using a purposive sampling technique to ensure a diverse representation of retail environments offering

plus-size garment in Ghana. The selection was based on the following. Small, medium and large scale fashion stores. It also considered geographic dispersion so that generalisation of consumer demographics could be achieved. The findings were based on the garment size charts commonly used in the Ghanaian fashion industry, which align with the sizing standards of the United Kingdom, United States of America, and Europe. This study utilized US and UK plus-size standards for pattern grading. While this provides a consistent framework for initial prototyping, it is acknowledged that these standards may not fully capture the specific anthropometric characteristics and body proportions of the Ghanaian female population. The absence of a national sizing standard for plus size women in Ghana presented a constraint. This implies that Ghana does not have its own standard measurement for plus size women.

Table 1. Results of sizes of clothing displayed in clothing stores

Store	Size		
	UK	USA	Europe
1	20	18	48
2	18	16	46
3	14	12	42
4	20	18	48
5	14	12	42
6	22	20	50
7	14	12	42

These findings from the stores suggest that women above a certain size may encounter challenges in finding appropriate clothing options. In many of these stores, plus sizes were not prominently displayed, and customers had to specifically request them from sales assistants who retrieved them from storage. Retailers often operate on a cost-per-square-foot model. There is a persistent bias that plus-size garments have a lower sell-through rate. Therefore, they are often allocated less desirable floor space (e.g., back corners, higher racks) to prioritize items perceived as more profitable. This indicates that it would be difficult for plus size customers to walk into most stores and get an apparel without asking for assistance. During the focus group discussions (FGDs), it became evident that individuals have diverse body shapes, although many could be categorized into specific body types, they exhibited distinct characteristics. The female body shape, also known as the female figure, is determined by a combination of skeletal structure, muscle quantity, and fat distribution across the body (Divoux et al., 2020). Similar to other physical attributes, there exists a broad spectrum of normality when it comes to female body shapes. The perception of an ideal or preferred body shape has varied significantly, encompassing considerations of both attractiveness and health (Garza et al., 2016). Women's bodies exhibit a variety of shapes, with the waist typically being narrower than the bust and hips. These inflection points, namely the bust, waist, and hips, are utilized to define fundamental body shapes based on the ratios of their circumferences.

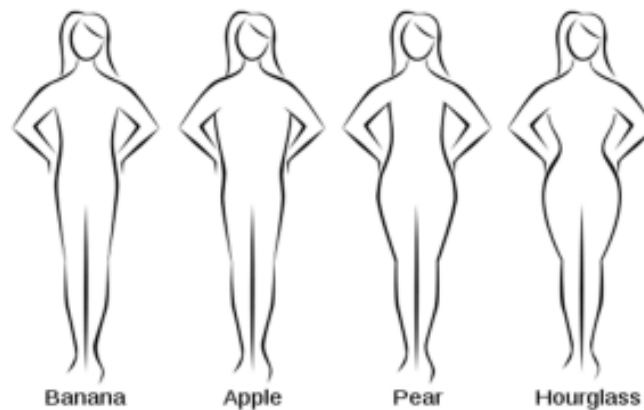


Figure 3. The four major body shapes of females (*Salusso Cited by Agbo & Igoli, 2015*)

In addition, it should be noted that the aging process inevitably affects the body shape of individuals. The levels of sex hormones in women play a role in determining the distribution of body fat (Mongraw-Chaffin et al, 2014). The concentration of estrogen, in particular, impacts the areas where body fat is stored (Frank et al., 2019). It is worth mentioning that there are variations in body fat distribution among individuals. Typically, women tend to accumulate fat around their abdominal region (gluteofemoral), resulting in an "apple-shaped" appearance (Mongraw-Chaffin et al., 2014).

The 'apple-shaped' body type (also known as central or android obesity) was specifically defined using the Waist-to-Hip Ratio (WHR). Following the World Health Organization (WHO) guidelines, a WHR of greater than 0.90 for men and 0.85 for women was used as the threshold for identifying an apple-shaped body type, characterized by greater fat storage around the abdomen compared to the hips. Participants were classified into body shape categories based on objective anthropometric measurements. This method was selected over self-reporting to ensure empirical accuracy and eliminate subjective bias in classification. Measurements were taken using a standardized measuring tape by trained researchers to guarantee consistency and reliability. The majority of participants (21) in the study had body forms characterized as "apple-shaped," which indicated fuller middles (bloated stomach), narrow hips, large breast and big arm as shown in Figure 4. This body shape also meant that they carried more weight above their waist, leading to a desire for innovative designs that could effectively conceal these perceived flaws. Furthermore, it was observed that many of the available apparel in the market failed to address the specific concerns of plus-size women. Participants consistently reported the most difficulty with finding well-fitting and stylish versions of casuals and smart casual such as trousers, shirts, blouses, dresses etc. They also expressed their dissatisfaction with fit and comfort of some clothes which were tight in some areas (arms, thighs, stomach) but too loose in others (bust, waist). With aesthetics and style, they expressed their dissatisfaction with lack of fashionable, trendy, or age-appropriate options. Finally, they expressed dissatisfaction with the functionality and quality of designs that are simply

"scaled-up" versions of smaller garments, resulting in poor proportions and fit. Therefore, the aim of the design processes undertaken in this study was to develop designs that could effectively address the issues highlighted by the participants during the focus group discussions.

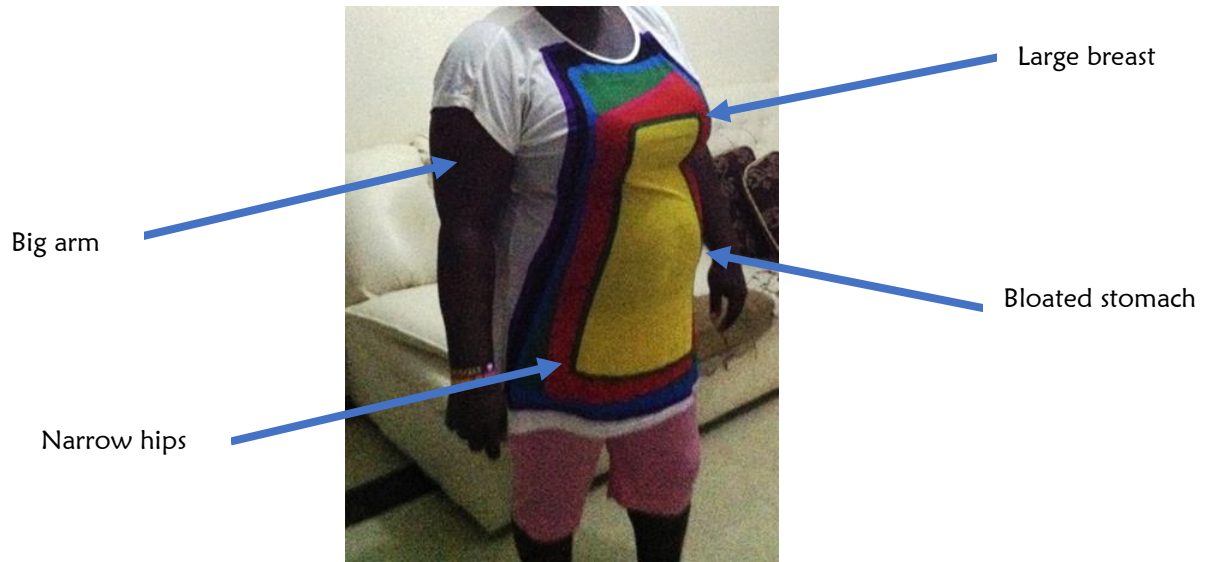


Figure 4. The Model (*Sawyerr, Safo-Ankama & Mefful, 2023*)

Preliminary Ideas

A collection of inspiration was compiled to create a theme board. A theme board clearly lays out the creator's ethics, making it possible for the creator to create components that are compatible with the main design (Brevi et al., 2019). It serves as an excellent communication tool when attempting to explain the creator's perspective or notion, making it easier to find inspiration (Chipambwa & Chikwanya, 2022). The inspiration for the mood board for the project was themed sea shell (Figure 5.). This was selected by the researchers because they believed it would help them create designs that would be suitable for plus size Ghanaian women. The seashell theme naturally connotes possible design thinking strategies that flatters, fits, comfort and aesthetic sensibilities for plus size. The organic forms suggestively present flowing lines, and structural ridges of seashells provide a foundational inspiration for creating flattering plus-size silhouettes. The seashell theme was strategically translated into specific design principles to address plus-size silhouettes. This was operationalized through the implementation of A-line and Empire waist silhouettes, which emulate the conical structure of shells to gracefully skim the torso. Vertical Lines and Asymmetric Draping were employed in the design thinking process to psychologically create an elongating and slim effect for the plus size figure. The innovation prioritized soft, fluid constructions and pliable textiles to ensure garments move with the plus size figure, making it both comfortable and elegant.

The aesthetic sensibility of the Ghanaian culture was considered in the design thinking process. The seashell theme contextually radiates the symbol of beauty presenting the concept of roundness and fullness which aligns with the plus size figure. The theme

board inspired the colour palette for design creation. A visual analysis for the shells adopted manifested subtle colours which illusionary were used to flatter and playdown on fitting issues of plus size figure. Darker colours within the colour palette were used to play down on fuller areas and lighter were used to flatter areas with fitting issues.



Figure 5. Theme Board (*Sawyerr, Safo-Ankama & Mefful, 2023*)

Elements and principles of design including lines, shapes, pattern, space, harmony among others derived from the theme board were manipulated to achieve final motifs (Figure 6.) which were used to design the final apparel. This study employed a structured design process to translate source motifs into final apparel designs. Each design was directly informed by a specific motif. Design 1 was developed from the structural and aesthetic qualities of Motif 8. while Design 2 derived its core concept from an analysis of Motif 5. Design 3 adapted the decorative and textural elements of Motif 2. The process consisted of two key stages. First stage was to identify and abstract the core visual elements (line, form, pattern) of each motif into stylistic guidelines. In the second stage established design principles including balance, proportion, and harmony were applied to assemble these styles into coherent, functional and aesthetically pleasing apparel.

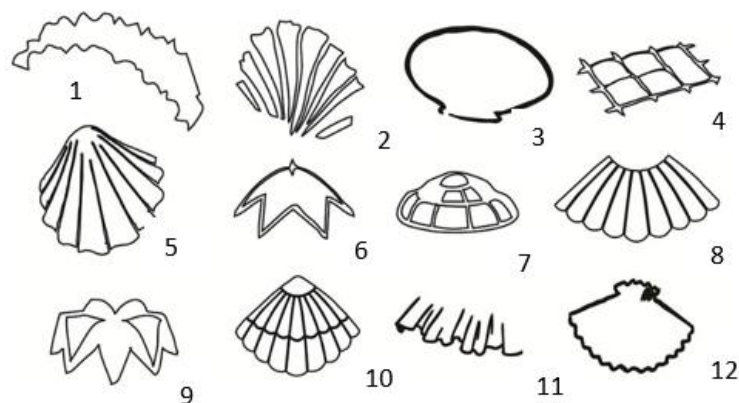


Figure 6. Motif Board (*Sawyerr, Safo-Ankama & Mefful, 2023*)

Initial concepts were generated by analyzing images of different apparel, and appropriate designs were selected to create a trend board (Figure 7.). This trend board served as a visual reference for developing innovative designs tailored specifically for plus-size women. Prior to concept generation, the researchers conducted an analysis of existing garments to identify design strategies and market gaps. A sample of 30 garments was purposively selected from a range of retailers. The criteria for selection included items that were marketed to plus-size women, reflected Ghanaian cultural aesthetics or contemporary trends, and addressed common fit issues.

The analysis employed a structured framework to deconstruct each garment based on silhouette, detail, construction, and fabric. The findings revealed a lack of stylish, breathable options for tropical climates and an over reliance on dark, concealing colours. These findings informed design objectives, leading to a focus on light-weight natural fabrics, light-coloured prints, and innovative seam placements that provide structure.



Figure 7. Trend Board (*Sawyerr, Safo-Ankama & Mefful, 2023*)

Design Refinement

In Lamb and Kallal's (1992) model, design considerations are classified into three categories: functional, expressive, and aesthetic. The specific aspects within each category may vary based on the targeted consumer. As depicted in Figure 1, functional considerations pertain to the practicality and usefulness of the apparel, encompassing

factors such as fit, mobility, comfort, protection, and ease of movement. Expressive considerations revolve around the symbolic and communicative elements of design. Lastly, aesthetic considerations align with the human pursuit of beauty and the idealized concept thereof. These three dimensions were integrated to develop apparel designs specifically tailored for plus-size women.

The initial ideas were carefully examined to assess their suitability, taking into account the established criteria from the FEA model. The model was used to address any conflicts between the identified priorities. Furthermore, additional factors like price were considered during the design development phase. A concise collection of ideas were chosen and further developed into tangible samples to address the design challenge. Below is a detailed description of the sample designs.

Design 1 (Figure 8.): The blouse features a sleeveless design with a pronounced 'V' neckline, complemented by princess darts and a waistband. The waistband leads to a knife-pleated peplum, adding volume and enhancing the appearance of the hips. The skirt is fitted and reaches knee length, incorporating contour darts for a tailored look. It was fastened with a zipper at the back. The peplum at the waist serves the purpose of providing fullness to enhance the flattery of the hip area. The introduction of the waistband aimed to define the waistline, creating an hourglass silhouette that is often considered the ideal figure type.

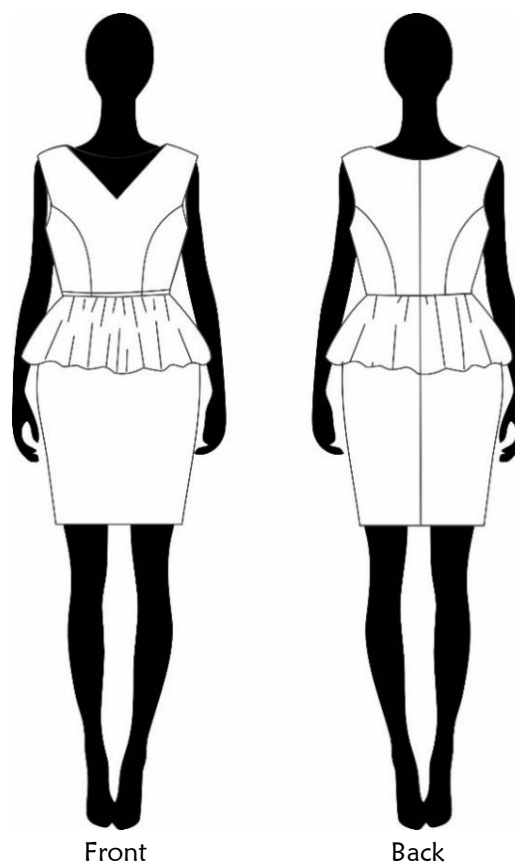


Figure 8. Design 1 (*Sawyerr, Safo-Ankama & Mefful, 2023*)

Design 2 (Figure 9.): The dress features a midi length with a round neckline and flared skirt. It has short sleeves and a unique design detail of box pleats running from the center of the neckline to the waistline of the upper part of the dress. The flared skirt adds fullness at the hip area, beautifully enhancing the hips of the wearer. To accentuate the figure, a waistband was incorporated to define the waistline, creating a distinct separation between the torso and the lower part of the body.

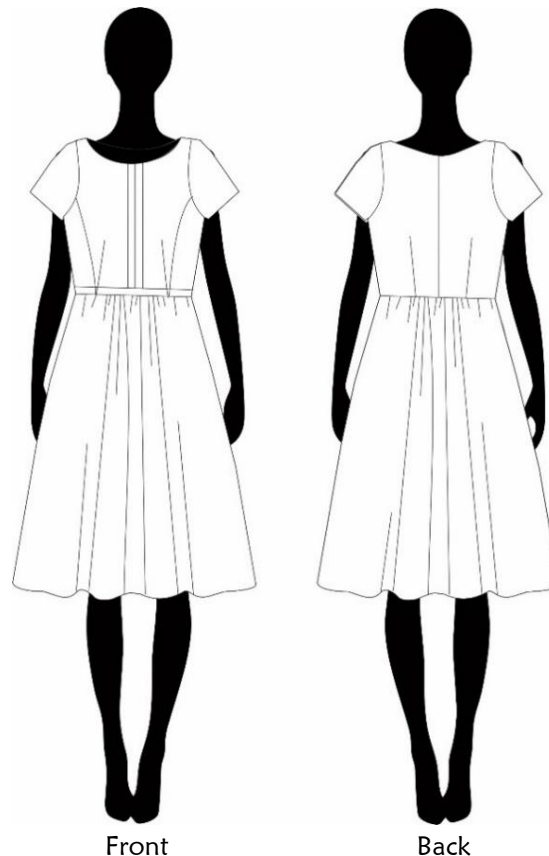


Figure 9. Design 2 (*Sawyerr, Safo-Ankama & Mefful, 2023*)

Design 3 (Figure 10.): The dress features an inverted pleat design with a slightly shaped V neckline and a princess dart detail. It has a cup sleeve and a zipper at the back, along with a contour dart for added shaping. The inverted pleat was strategically placed to introduce fullness and flatter the hip area, creating an hourglass shape that is often considered the ideal figure type.

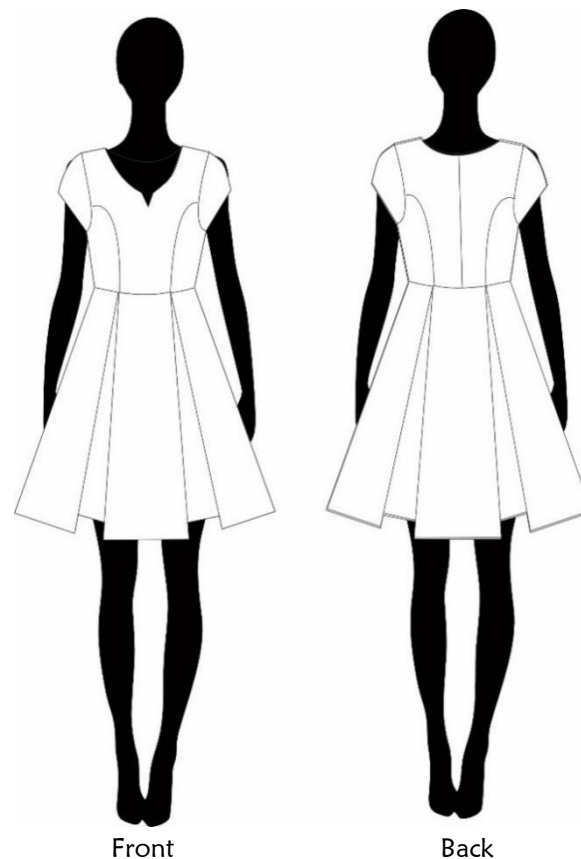


Figure 10. Design 3 (*Sawyerr, Safo-Ankama & Mefful, 2023*)

The final design solutions were evaluated against the three principles of the Lamb and Kallal (1992) Apparel Design Framework to ensure they met the holistic needs of the target user. Below, the specific contributions of each design are detailed in relation to the model. The final design solutions were evaluated against the three principles of the Lamb and Kallal (1992) Apparel Design Framework thus Functional (utility and performance), Expressive (communication and identity), and Aesthetic (visual appeal and harmony) to ensure they met the holistic needs of the target user. The specific contributions of each design in relation to this model are detailed below.

Design 1 addresses the functional principle through features such as wide armholes and the use of breathable fabrics, which enhance ease of movement and comfort in Ghana's tropical climate. In terms of the expressive principle, the design incorporates bold prints and a modern silhouette that communicate confidence and contemporary style, directly aligning with user preferences for fashion-forward, non-matronly clothing. The aesthetic principle is realized through asymmetric draping and a carefully curated colour palette, which together create a flattering, elongated silhouette and achieve visual harmony.

Design 2 prioritizes the functional principle through an adjustable waist and reinforced seams, which accommodate fluctuating body measurements and ensure garment durability. The expressive principle is addressed through the integration of cultural motifs and vibrant colours, which reflect Ghanaian identity and cultural pride. The

aesthetic principle is achieved through an A-line silhouette and strategic seam placement, which gracefully skim the midsection to create a non-constricting, flattering form.

Design 3 responds to the functional principle through the use of stretch fabric and a hidden zipper, which provide flexibility and ease of dressing. For the expressive principle, the design features a statement sleeve and a modern cut, empowering the wearer through fashion-forward styling. The aesthetic principle is realized through vertical tucks and colour blocking techniques, which direct the eye vertically to create a slimming and elongating effect.

All together the contributions of this design process, as framed by the Lamb and Kallal model are that, functionally, the designs address the practical needs of the plus-size Ghanaian woman through features such as adjustable closures, breathable fabrics, and ease of movement, thereby improving wearability in a tropical climate. Expressively, the designs challenge the stigma associated with plus-size fashion by offering culturally relevant, stylish options that communicate confidence and identity, moving away from the traditional tendency to conceal. Finally, aesthetically the designs prioritize flattering silhouettes, strategic seam placements, and culturally resonant colour and pattern choices, demonstrating that plus-size apparel can be both elegant and modern.

Prototype Development

The final designs were developed into prototypes using suitable materials and techniques. Based on the feedback gathered from the focus group discussions, it was evident that the participants, who were plus size women, desired apparel that could effectively conceal issues with body orientation, provide a proper fit, and exhibit aesthetic appeal. These preferences were carefully incorporated into the design process to ensure their fulfillment during the production of the prototypes. Flat patterns of the designs were created using the model's (as shown in figure 4) measurements, and these patterns served as the basis for producing sample apparel. The samples were then assessed by a selected group of plus size women to determine if the samples met their needs and preferences. It's worth noting that the chosen model for garment assessment had an apple-shaped body form, as shown in figure 4, enabling the researchers to thoroughly evaluate the functional, expressive, and aesthetic aspects of the innovative designs. The prototype designs are shown in Figures 11.–Figure 13..

The model wore the three designs, and they were evaluated by a group of five (5) plus size women who had previously participated in the focus group discussions. Their task was to assess and provide feedback on the satisfaction levels regarding the functionality, expression, and aesthetics considerations of the apparel designs.

Evaluation

The Evaluation stage involves assessing the prototypes based on the criteria established in the Problem Identification stage. Subjective measurements are taken to evaluate how

well the prototypes meet the functional, expressive, and aesthetic requirements set beforehand. Based on the evaluation findings, elements of the designs can be modified, refined, or removed as needed, leading to the Implementation stage. The evaluation of each design is discussed below.

Prototype 1 (Figure 11.)

All participants expressed satisfaction with the fit of the garment. They mentioned that the model looked comfortable and that it was evident from her face and overall appearance. The model also confirmed that the dress was easy to put on and remove. She mentioned that as a corporate worker, the style was suitable and boosted her self-esteem. Participants expressed their happiness with how the elements and principles of design were combined to create the garment. One participant stated

"I am very pleased with the color combination of the fabrics used in the style".

Bright colours tend to make a body form appear larger, while dull colours make objects appear smaller (Hagtvedt & Brasel, 2017). Therefore, a dull-coloured fabric was used for the blouse to minimize the appearance of the model's heavy upper body, while a warm color (red) fabric was used for the skirt to enhance the appearance of her narrow lower body. Based on the discussions, all the participants expressed satisfaction with the functional, expressive, and aesthetic considerations of apparel design one.



Figure 11. Prototype 1 (*Sawyerr, Safo-Ankama & Mefful, 2023*)

Prototype 2 (Figure 12.)

The participants expressed their enthusiasm for the dress's beauty. They appreciated the colours and how the style effectively concealed body faults. They found the style to be

suitable, and they believed the model looked confident in it. One participant shared her observation, stating,

"Just look at Ama (the model)...she looks so beautiful and confident in the dress. This is what we are talking about. Plus-size women also deserve stylish dresses."

The participants also noted that the dress fitted well and allowed for ease of movement. The model appeared very comfortable wearing it, and she confirmed that it was easy to put on and remove. As a result, garment design two successfully fulfilled the functional, expressive, and aesthetic considerations of the target consumer (plus-size women).



Figure 12. Prototype 2 (*Sawyerr, Safo-Ankama & Mefful, 2023*)

Prototype 3 (Figure 13.)

Regarding the functional aspect of the design, participants noted that the design fit well, allowed easy movement, and provided a comfortable wearing experience. The model confirmed these observations. Additionally, participants expressed satisfaction with the style, describing it as simple, presentable, and confidence-boosting for anyone wearing it. One participant specifically mentioned the pleats, praising their transformative effect on narrow hips, while another remarked that the dress would be suitable for a Sunday church service. The participants also expressed contentment with the selection of fabric and colours. Overall, the participants were pleased with all aspects of the apparel design framework.



Figure 13. Prototype 3 (*Sawyerr, Safo-Ankama & Mefful, 2023*)

Conclusion and Recommendation

The innovative apparel design project for plus size women in Ghana has successfully addressed the challenges faced by this figure type in finding suitable and flattering clothing options. Through a comprehensive design process that incorporated functional, expressive, and aesthetic considerations, the project aimed to enhance the confidence and self-esteem of plus size women by providing them with stylish and well-fitting apparel. The project began by identifying the specific needs and preferences of plus size women through focus group discussions and assessments of existing clothing options in popular stores. It became evident that many of the available choices did not cater to the body shapes and desires of this consumer group. As a result, the design process focused on creating innovative designs that could effectively conceal body faults, provide a proper fit, and enhance the overall aesthetic appeal. By integrating functional aspects such as fit, comfort, and ease of movement with expressive and aesthetic considerations, the project team successfully developed three garment designs specifically tailored for plus size women. These designs incorporated optical illusions, creative use of colour combinations, and strategic design elements such as peplums and frills to accentuate desirable features and camouflage perceived faults.

Through rigorous evaluation and testing, the prototypes were assessed against established criteria, ensuring that they met the functional, expressive, and aesthetic needs of plus size women. The feedback and satisfaction of both the model and the participants from the focus group discussions played a crucial role in refining and improving the designs. The project has not only provided practical solutions for plus

size women in Ghana but has also challenged societal norms and beauty standards. It has emphasized the importance of inclusivity in the fashion industry and the recognition that all body types deserve to feel confident and empowered in their clothing choices (Papadopoulou and Bazaki, 2019).

This study presents three key contributions to apparel design research. First, it offers a structured methodology for creating designs for underserved populations, specifically plus-size Ghanaian women. It strengthens research methods by providing clear reasoning for each design decision, while also making the project more culturally meaningful by focusing on local styles. Finally, it is in line with Tullio-Pow et al. (2021) on co-design for plus size figures as it demonstrates practical co-design processes that successfully translate abstract inspiration into wearable apparel.

This study opens several avenues for future research and practical application. To deepen the theoretical and practical contributions, subsequent work should investigate the integration of emerging technologies, such as smart textiles and wearable devices, specifically tailored to the needs and preferences of plus-size consumers. This would not only enhance functionality but also position inclusive design at the forefront of technological innovation. Furthermore, research is needed to identify and overcome the systemic barriers to the widespread adoption of inclusive designs within the mainstream fashion industry. Examining viable supply chain models, scalable production techniques, and effective marketing strategies for the plus size market is crucial for translating academic insights into industry-wide practice. Finally, to bridge the gap between research and real-world impact, there should be partnership between academia and fashion industry professionals, retailers, and policymakers, and leveraging high-visibility platforms such as curated fashion shows or industry exhibitions to significantly amplify the societal impact and commercial viability of such projects.

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Figures

Figure 1. Lamb, J. M., & Kallal, M. J. (1992). A conceptual framework for apparel design. *Clothing and Textiles Research Journal*, 10(2), 42–47. <https://doi.org/10.1177/0887302X9201000207>

Figure 2. Debrah, A. (2014, May 15). *The worst dressed lady at the 2014 VGMA*. News Ghana. <https://newsghana.com.gh/the-worst-dressed-lady-at-the-2014-vgma/> (Accessed on 14.07.2024)

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Figure 4–Figure 13. Author's Archive (2023).

Tables

Table 1. Author's Construct.