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Bi-Design Variable: Fabricating a Culturally Embedded Disassemble Bridal Necklace for the Ghanaian Nzema Woman

Andrew Richard Owusu Addo ^{1*}, Kwame Baah Owusu Panin ², Nana Yaa Adjeiwaa Poku ³

¹⁻³ Department of Jewellery Design; Techbridge University College, Ghana

* Corresponding Author: Andrew Richard Owusu Addo

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Abstract

This paper describes the design and construction of a 'bi-design variable' artefact, a bridal necklace, which has been specifically designed for Nzema brides and married women of the southwestern part of Ghana. The study adopted a studio-based qualitative research methodology, with field research undertaken in Anyinase (Western Region), to address the questions of the loss of traditional Ghanaian bridal jewellery and the growing financial constraints of modern wedding culture. The data collection method used was, interviews, questionnaires and documentary analysis, which involved elderly women, artisans and traditionalists in the Nzema community. The resulting artefact, a necklace of silver-plated copper, featuring filigree, granulation, chasing and piercing techniques, can be broken down into four separate jewellery pieces: two necklaces, a silver brooch and a beaded necklace. Clan symbols, colour semiotics and matrilineal cultural values have been embedded in the design, making the necklace a cultural investment for the ages, rather than a one-off accessory. The paper contends that an effective synthesis of heritage conservation, economic considerations, and aesthetics in the design of culturally based, multifunctional jewellery can be said to be a fertile fusion of current jewellery-making practice in Ghana.

Keywords: bi-design variable, bridal jewellery, disassemble necklace, filigree, granulation

Introduction

Throughout centuries and civilisations, jewellery has been an integral part of human decoration, expression and culture. Jewellery is always been a way to communicate status, spirituality, beauty and belonging, from the perforated marine shells found in Cueva de los Aviones, Spain, around 115,000 years ago (Zilhão, 2018) ^[16], to the ornate ostrich-eggshell beads of Kenya, and the goldwork of West African court traditions. In the modern Ghanaian setting, jewellery is still an essential part of the wedding arrangements; however, over time, the West's changing notions of beauty have also made Ghanaian weddings more and more indistinguishable from the Ghanaian weddings of yesteryear (Rosenbalt, 2020) ^[9]. This study seeks to counter that cultural erosion by creating and manufacturing a functional, culturally relevant and cost-conscious piece of bridal jewelry.

The Nzema are an Akan group with a long history of female decoration, which has traditionally been used to signal social status, marital status, and clan identity, and who are spread over the south-western part of Ghana and the south-eastern part of Côte d'Ivoire (Valsecchi, 2001) ^[15], with a population of around 328,700. In the past, Nzema women did not use a marital ring to indicate marital status, rather, they used only a single string of sand beads referred to as *Bɛko avilɛ* in the Nzema language, by personal communication (Madam Faustina Ekuba Mensah, 21–23 June 2022). This practice is part of a wider Nzema cultural philosophy that material things have a social meaning that is encoded and read by members of the community but not by outsiders (Valsecchi, 2001) ^[15], that is, the layered identity construction that is part of Nzema social life.

The current cost of marriage in Ghana has also risen significantly with a significant amount of the marriage budget being spent on jewellery and the decoration of the bride, which often is of no use after the marriage (Anubha, 2019) ^[2]. This study suggests a design solution to this economic and cultural problem by creating a 'bi-design variable' necklace; a coinage of the prefix 'bi,' meaning 'two' (Collins Dictionary) to indicate that the necklace can be used either as a whole necklace, or as separate component pieces. The study was aimed at achieving two objectives: the first was to identify the tools, materials and process of fabrication suitable for the Nzema woman in relation to bridal jewellery and the second was to design and fabricate a bridal

Nzema jewellery artefact that can be disassembled into separate pieces and put together without the aid of professionals.

Theoretical Framework

Two theoretical approaches were employed in this study, both of which cover the dual nature of design, aesthetic and functional, of culturally meaningful jewellery. The research is based on the cultural materialist view of jewellery as a product of material culture which can serve at the same time physical, aesthetic, and symbolic purposes. In this context jewellery is not just an adornment but an emblem of social significance created and interpreted in a given cultural context. Historically, the colour, material and shape of adornment objects in West Africa have conveyed information about a wearer's life stage transition, spiritual status and kinship group, and social status (Ata Aidoo *et al* 2011)^[3]. The *Beko avile* (single string sand bead necklace) is a culturally specific semiotic signal of marital status that is more culturally integrated and nuanced than the wedding ring that has now increasingly replaced it in the Nzema context. African adornment traditions are well symbolized with the colours of the beads. Yellow beads are symbols of success, wealth and status, green beads are symbols of new life and healing, red beads are symbols of grounding and emotional stability, and combinations of white and blue mean femininity and the rhythms of the moon (Ata Aidoo *et al.*, 2011)^[3]. These colour codes helped to dictate the materials that were included in the bi-design variable necklace including the selection of coloured sand beads for the *Beko avile* part. This unit covers the creation of a range of jewellery designs and pieces that demonstrate a range of functionality and versatility. The second premise for this study is based on the design theory that focuses on the concept of multi-

functionality as a reaction to the economical and practical need of the users. The bi-design variable approach was inspired by Tymoshchuka's (2017)^[12] Berehnyia necklace, a Ukrainian silver, enamel, coral and zirconium piece which comes apart into two bracelets and a brooch. In the design of the jewellery artefact, Tymoshchuka shows that it can be created for different occasions and different needs without the need of professional intervention for assembling/disassembling, thus enhancing the functional life and economic value of the artefact. During 2015, the Berehnyia necklace was made at Chernivtsi National University by soldering, engraving and sawing methods with bezel stone setting (Tymoshchuka, 2017)^[12]. This precedent allowed the design possibility in the present study to be appropriate for the Nzema cultural and material needs for bridal jewellery.

Review of Related Literature

Historical Origins and Global Significance of Jewellery

Similar to any other art form, jewellery has a history and is significant in the world. Like all art, jewellery has a story and is important in the world. Jewellery comes from the Old French word 'jouel', which in turn is from the Latin word 'Jocale', meaning 'plaything' (Paige, 2020)^[7]. Yet, from this etymologically simple term, jewellery has become a deeply social, spiritual and aesthetic phenomenon throughout human history. The desire to decorate the body is very ancient, as shown by perforated marine shells from the Cueva de los Aviones, Spain, which date to some 115,000 years ago, well before the advent of the art of working metal (Zilhão, 2018)^[16]. Jewellery has since become a symbol of social status, a means of spiritual security and a statement of personal and collective identity (Rosenbalt 2020)^[9].



Fig 1: Perforated marine sea shells used as beads, c. 115,000 BP (Zilhão, 2018)^[16]

Jewellery Typology Relevant to the Study

Neck jewellery, the category most directly relevant to this study encompasses necklaces, chains, pendants, and chokers, each with distinctive formal characteristics and social registers. A necklace is a continuous piece worn around the neck, often of metal with or without gemstones, that functions as a subtle framing device for the neck and face (Diamond

Rocks Magazine, 2021)^[4]. A pendant is a suspended feature that hangs from a necklace chain, drawing the eye downward toward the collarbone and neckline (Diamond Rocks Magazine, 2021)^[4]. A brooch, while not a neck piece, is a versatile ornament that pins to clothing or may be integrated into a necklace assembly, as in the present design. The bi-design variable necklace incorporates all three typological

forms, necklace, pendant, and brooch as components of a single disassemble system.

African Beads: Currency, Ceremony, and Spiritual Meaning

Beads occupy a central position in West African jewellery traditions, functioning historically as trade currency, ceremonial marker, spiritual ornament, and status indicator. Prior to the monetisation of West African trade in the modern period, beads made from gold, iron, ivory, bone, and cowrie shells served as the principal medium of exchange (Ata Aidoo *et al.*, 2011)^[3]. When Portuguese trading ships arrived on the West African coast in the fifteenth century, glass beads entered the currency system, rapidly becoming a high-demand commodity whose production in European factories expanded to meet African market appetite (Ata Aidoo *et al.*, 2011)^[3].

Following the demonetisation of trade beads in the late nineteenth century, beads assumed increasingly ceremonial and aesthetic roles within West African social life. The Dipo puberty ceremony of the Krobo people of Ghana, for instance, centres on the ritual application of family heirloom beads around the waist of a young woman completing her transition to adulthood beads passed across generations that communicate lineage, pedigree, and spiritual protection (Ata Aidoo *et al.*, 2011)^[3]. Beads are worn at marriage ceremonies to declare familial heritage, and the finest bead necklaces may be placed on the body of the deceased at funerals as marks of a life's accumulated dignity (Ata Aidoo *et al.*, 2011)^[3].

The spiritual dimension of bead use is particularly significant in the Nzema context. The colour semiotics of West African beads, yellow for wealth and status, green for life and healing, red for grounding, white-and-blue for femininity provided a framework for the colour palette of the bi-design variable necklace (Ata Aidoo *et al.*, 2011)^[3]. The incorporation of coloured sand beads in yellow, red, green, and white into the Beko avile component of the necklace is thus not a purely

decorative decision but a culturally coded communicative act.

The Nzema People: Culture, Identity, and Feminine Adornment

The Nzema are an Akan people of approximately 328,700 individuals, of whom 262,000 reside in southwestern Ghana and 66,700 in the southeastern Côte d'Ivoire (Valsecchi, 2001)^[15]. They maintain a matrilineal kinship system through which descent, property, and social identity are transmitted through the maternal line; a structural feature of Nzema society that invests women with particular cultural and economic significance (Egya-Blay, 1987)^[5]. The annual Kundum Festival, celebrated across the Ahanta and Nzema areas, coordinates with the harvest season and serves as the occasion for ritual drumming, singing, dancing, and the expulsion of malevolent forces, a festival context in which the full spectrum of Nzema adornment traditions is publicly displayed (Valsecchi, 1999)^[14].

Nzema women are culturally renowned for their assertiveness, independence, and economic agency (Agovi, 1989)^[1]. Historically, however, their social visibility was constrained by customary practices that excluded women from formal public discourse. The traditional markers of feminine identity among the Nzema including the Beko avile bead necklace worn by married women, the two-piece cloth ensemble of wrap and Kaba worn by brides, and the yellow colour palette signifying the wealth and wisdom of the husband collectively constitute a rich material grammar of Nzema feminine status (personal communication, Madam Faustina Ekuba Mensah, 2022). The Nzema group is organised around seven clans (Table 1), each identified by a totemic symbol and a set of associated social qualities. These clan totems: Fire, Rice, Corn, Palm, Rafia Palm, Yam, and Gold, provided a repertoire of symbolic forms from which the design of the bi-design variable necklace drew directly, particularly in the pendant shape, which represents the Alonwoba clan's Rafia Palm totem.

Table 1: The Seven Nzema Clans, Their Totems and Associated Qualities

Nzema Clan	Symbol (Nzema)	Totem	Qualities
Ndweafɔɔ	Senle	Fire	Honesty, Industriousness
Ezohile	Awule	Rice	Statesmanship, Patriotism
Nva Vile	Abele	Corn	Eloquence
Adahonle	Arele	Palm	Calmness, Patience
Alonwoba	Doka nee Awa	Rafia Palm	Bravery, Statesmanship, Patience
Azanwole	Elue	Yam	Uprightness, Honesty
Asamangema Mafɔle	Ezukoa	Gold	Bravery, Aggressiveness



Fig 2: Beko Avile — the traditional Nzema married woman's single-string sand bead necklace

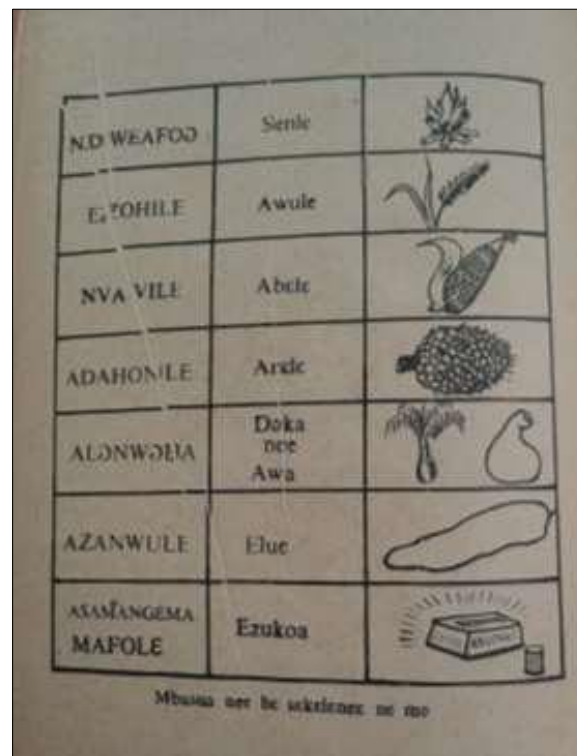


Fig 3: The seven Nzema clan symbols and their totems

Methodology

Research Design

The study used a qualitative research method that included a field review and studio-based research. Since Nzema feminine adornment is an area of social meanings and cultural practices that is explorative and interpretive, the qualitative approach was deemed appropriate in developing rich understanding of the area (Singh, 2022) ^[11]. The quantitative methods which were geared towards statistical and causal analysis were considered inappropriate methods to the study's humanistic and creative aims. The studio aspect of the research approach is based on the practice-based research tradition in the field of art and design, which recognises creative making as legitimate research practice and a way to generate new knowledge through the making process itself (Singh, 2022) ^[11].

Fieldwork and Data Collection

The researcher carried out fieldwork research in Anyinase, a town located within the Western Region of Ghana, for a period of one week, during which he was in direct engagement with the members of the community. The selected target group consisted of elderly women, artisans, traditionalists and jewellery users among the Nzema people who possess experience in the special skills of the feminine adornment traditions. Purposive sampling was used to select participants with knowledge and experience directly related to the research questions (Singh, 2022) ^[11]. The instruments of data collection were semi-structured interviews, questionnaires, and documentary. While the personal communication with Madam Faustina Mensah Ekuba, a retired Educationist, was of particular significance to establish the cultural protocols surrounding Nzema bridal adornment, including the convention of the Beko avile bead necklace as the indicator of married status (personal

communication, 21–23 June 2022), the same was true for other researchers who visited the study area.

Data Analysis

Thematic analysis was used to identify the patterns in data collected during the fieldwork and from documents and to code and synthesize them into design principles. The salient points that emerged as design guides were: the necklace's primary importance in the Nzema marital signification system, the importance of yellow in bridal colour palette as symbolic indication of gold, wealth and husband's wisdom, the use of clan's totem as a symbolic vocabulary for the design of the necklace and the two-piece cloth arrangement (wrap and Kaba) as a reference garment for which the necklace must be aesthetically calibrated.

Studio Process

The studio process was divided into three parts: Desk study; the history and typology of jewellery was explored, and electronic and printed resources used to inform this research; Field work: the collection of data from the community; and Studio work; the design and making of the necklace. The design process included ideation sketches, a 2D digital rendering created in the computer program Coral Draw, and the 3D fabrication of the artefact using a variety of metalsmithing techniques such as soldering, piercing, filigree, chasing, granulation and filing (Untracht, 1985) ^[13].

Results and Discussion

Materials and Fabrication Methods

The main materials used in making the bi-design variable necklace were copper and silver; and once finished the whole metallic part of the necklace was silver-plated. Table 2 records all the materials used, the detail of their specifications and the materials' specific functional uses within the artefact.

Table 2: Materials, Specifications, and Applications in the Bi-Design Variable Necklace

Material and Form	Thickness	Application
Copper wire	0.95 mm	Cut into small portions, melted, and used as granules
Copper plate	0.8 mm	Main neckpiece structure incorporating filigree, palm tree motif, and chased portions
Silver plate	0.8 mm	Back cover of the brooch
Twisted copper wire	1.9 mm	Filigree filling within the neckpiece framework
Silver wire	1.5 mm	Pin and lock mechanism for the brooch
Silver sheet	1.9 mm	Brooch body production
Copper jump rings	2.1 mm	Links connecting the pendant to the main piece and the main piece ends to the silver necklace
Silver wire	2.0 mm	Internal bead armature
Silver jump ring	3.0 mm	Links for the pendant assembly

The most common fabrication processes used included soldering (Untracht, 1985) ^[13] the bonding of metal components by heating a metal alloy solder to its melting point, piercing (Untracht, 1985) ^[13] the production of clean-cut shapes from sheet metal, filigree (Untracht, 1985) ^[13] the delicate twisting and weaving of thin metal strips to achieve surface texture and ornamentation, chasing (Untracht, 1985) ^[13] the hammering of metal from the front face to sink and model the surface, granulation (Untracht, 1985) ^[13] the application of spherical metal granules to a surface to add texture, and filing (Untracht, 1985) ^[13] the removal of excess material with files and successive grades of emery paper. These techniques created an overall effect that combines the exactitude of West African technical metalsmithing and the evocative surface details of traditional West African metalwork.

Design Development

The design process started with ideation sketching, with several different formal ideas developed and analyzed. After generating sketches of the various designs with different types of necklaces, the researcher created generational sketches to reflect different shapes of pendants and different configurations of structures before deciding on a design that met the cultural needs found in the fieldwork, namely the use of the Rafia Palm totem in the shape of the pendant and the Bèkò avilè sand bead necklace as a traditional marital signifier. The chosen concept was then drawn into a detailed 2D digital drawing utilizing the program Coral Draw which created single piece drawings and a total assembly drawing of the complete necklace.

**Fig 4:** Initial ideation sketches by the researcher

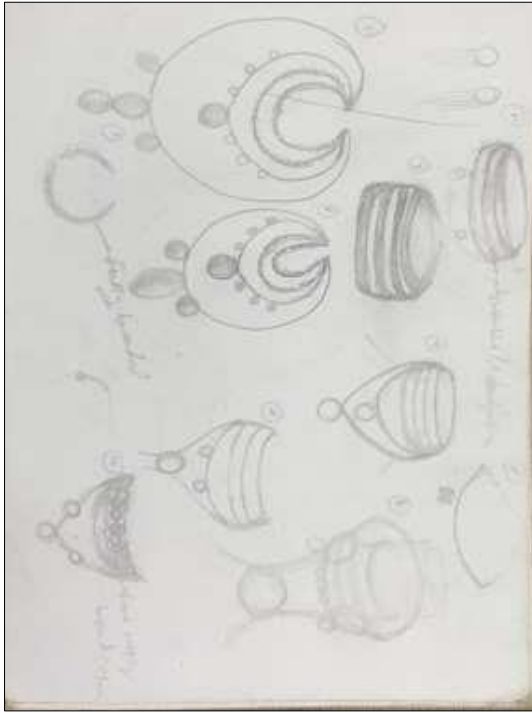


Fig 5: Generational design sketches

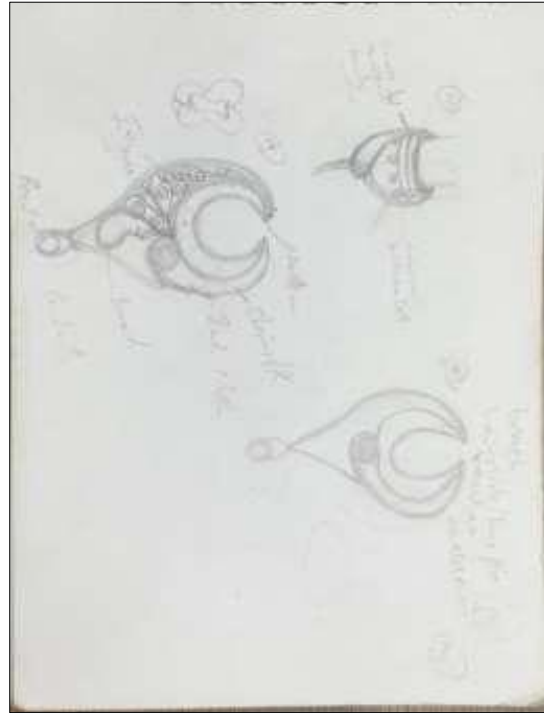


Fig 6: Detailed sketches with design specifications

Fabrication Process

As the fabrications of the bi-design variable necklace were carried out, a photographic record was made of the various sequential operations performed in the studio (Figures 7–20). The work started by drawing the wire of silver through a drawplate to the proper gauge (Figure 7), then the silver wire

was coiled and cut into jump rings (Figure 8). The jump rings were gathered within a workbench pouch before they had been put together (Figure 9). The principal copper element of the neckpiece, a body, was chased (hammered from the front to fashion its shape) in a series of hammers that gradually formed the crescent shape of the central element (figure 10).



Fig 7: Drawing silver wires to gauge



Fig 8: Cutting coiled silver wires into jump rings



Fig 9: Jump rings assembled in workbench pouch

The making of the brooch part of the necklace (one of its four separate, removable pieces) was done by punching it into shape (Figure 11) and then assembling the parts (Figure 12) before soldering. The silver wire pin & locking system for the brooch was handmade (Figure 13). The parts were printed on the 2D Coral Draw, and the major components were fabricated, then assembled with the 2D Coral Draw printout

to check the scale and relationship between the parts (Figure 14). The sculpture was embellished with filigree wire coils, the results of which were obtained by twisting and shaping copper wire, and were soldered into the framework of the neckpiece (Figure 15), adding to the ornamentation and the topographical texture of the artefact.



Fig 10: Chasing the main neckpiece



Fig 11: Stages in the brooch construction



Fig 12: Brooch components in preparation



Fig 13: Unfinished silver brooch and handmade pin



Fig 14: Major neckpiece parts positioned against 2D Coral Draw printout



Fig 15: Soldering filigree parts into the neckpiece framework



Fig 16: Completed filigree sections soldered in place

The researcher used the small copper spherules produced by the process of granulation of copper wire to texture the rounded shape at the bottom of the main neckpiece, which was inspired by the heavy rains experienced during the period of the fieldwork in the village of Anyinase; the rounded shape

was thus interpreted as representing rain drops (Figure 17). The pendant bead was made by melting silver into a ball, hammering it into a thick disc, soldering a silver rod through the centre and wrapping the twisted wire around the bail area to form the bead pendant (Figures 18-19).



Fig 17: Granulation process — copper spherules applied to the rounded neckpiece element



Fig 18: Major parts of bridal necklace after soldering



Fig 19: Final assembled necklace before silver plating

When all of the metalwork was finished, the entire copper portion of the necklace was silver plated, giving it a warm copper color overlaid with a bright silver finish that matched the precious metal nature that was called for in a jewellery piece for a bride's neck. The Bêkò avilê sand bead necklace,

which used yellow, green, red, purple and white beads to represent culturally important colour semiotics of Nzema dress, was strung and secured to the main necklace assembly with copper jump rings (Figure 22).



Fig 20: Copper main neckpiece after silver plating



Fig 21: Necklace assembly after silver plating



Fig 22: Bəko Avilə — the sand bead necklace component

The Completed Artefact and Its Disassemble Components

The finished bi-design variable necklace (Figure 23) looks like one necklace when put together. It is disassembled to reveal four individual jewellery pieces: Bəko avilə sand bead necklace (traditional marker for married women of the Nzema people); the silver chain necklace; the silver brooch (which can be worn as a pendant on the main necklace when

it is not used as such); and the beaded pendant (which could be worn as an independent pendant on the necklace of the silver chain). This versatility in structure allows the bride to put on the full ensemble on the day of her wedding, and then make regular use of every piece afterwards thereby ensuring that the investment is economically viable in the years post-wedding (Anubha, 2019) ^[2].



Fig 23: Complete bi-design variable bridal necklace — assembled form



Fig 24: Detached pendant component worn independently



Fig 25: Silver necklace component

Aesthetic Analysis and Cultural Symbolism

The bi-design variable necklace incorporates various design concepts as well as design elements such as variety, contrast, repetition, emphasis, texture, shape and colour (Untracht, 1985)^[13]. The filigree work adds to the surface texture of the body of the neckpiece in a crescent form, creating contrast with the smooth granulated sphere and the open silver chain. The pendant shape design was intended to reflect the Rafia Palm totem of the Alonwoba clan, one of the seven clan symbols of the Nzema clan, and serve as an assertion of the wearer's clan allegiance to people within the community who can read this visual language. The granulated sphere symbolizes rain drops, influenced by the constant rain during the fieldwork and reflects the abundance of the agricultural life that is honored in the Kundum Festival (Valsecchi, 1999)^[14].

The Beko avile sand bead component's colour palette is an expression of multiple cultural messages: yellow beads indicate wealth and knowledge of the husband; green beads reflect new life appropriate to the onset of marriage; red beads represent emotional groundedness; and white beads symbolize the feminine and spiritual aspect of the moon's influence on Nzema cosmological knowledge (Ata Aidoo *et al.*, 2011)^[3]. This chromatic vocabulary allows the necklace to be part of the Nzema cultural semiosis yet also be aesthetically interesting for people who don't have Nzema cultural knowledge.

Conclusion

This study has shown that culturally inspired and contextually flexible jewellery design is a promising solution to two challenges that are becoming increasingly common for contemporary Ghanaian bridal culture, namely the rising cost of wedding jewellery which becomes obsolete quickly after the marriage day, and the gradual disintegration of uniquely Nzema adornment practices due to the influence of western aesthetic conventions. The bi-design variable necklace, made through the soldering, piercing, filigree, chasing, granulation and filing processes, eliminates both pressures by creating one artefact that conveys Nzema identity through its form, symbols and palette, and an engineered structure that will disassemble into four separate jewellery pieces for use in daily life following the wedding.

The Alonwoba pendant, the granulated sphere symbolizing agricultural rainfall, and the Beko avile sand bead necklace, a traditional marker of Nzema marital status, along with the culturally coded colour palette of yellow, green, red and white, can all be seen as a material declaration of Nzema identity – both legible to community members and appealing to wider audiences. The artefact has achieved both the goals of the study: that is, the identification of the appropriate tools, materials and fabrication methods for Nzema bridal jewellery, and the production of an artefact which can be disassembled and reassembled without professional assistance.

Based on the study two recommendations were put forth. The weight of the necklace should be reduced in future iterations, especially for the brooch, to make it more comfortable to wear for brides of all shapes and sizes.

Secondly, the pendant could be designed as a ring element to allow it to be used as a finger ring when the necklace is dissembled, thus further enhancing the versatility of the bi-design variable concept and expanding the four jewellery functions to a fifth.

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