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Exploring the Factors Influencing Leather Offcut Classification as Waste or Resource among Footwear Producers in Ghana

Albert Kwame Arthur^{1*} Issah Mohammed Seini²

¹Department of Art Education, University of Education, Winneba

ORCID ID: <https://orcid.org/0009-0007-2402-8533>

²Department of Art and Design Innovation, Tamale Technical University, Tamale

ORCID ID: <https://orcid.org/0009-0006-3439-9904>

* Corresponding author: akarthur@uew.edu.gh

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Abstract

The use of waste as a resource is gaining momentum in environmental sustainability literature. Although previous studies have confirmed the existence of a significant amount of solid leather waste, there is limited understanding of why these offcuts get disposed as waste. This study uses the Theory of Waste Management as a lens to investigate how footwear producers classify leather offcuts as waste or resource and the implications of this for environmental sustainability. Using a qualitative approach and an exploratory design, the study collected data through semi-structured interviews from 20 and 17 footwear producers in Kumasi and Tamale respectively. Data was analysed thematically using open and axial coding strategies. Findings from the study revealed that leather offcut value was determined by perceived functionality and practical considerations like

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production demands and storage space. The study concludes that leather offcuts become waste because perceptions of value are shaped by existing production practices; and this constrains perceived use case possibilities within an operational environment that discourages retention and reuse. This shifts attention to the social and practical contexts in which value is assigned to materials. The study recommends awareness creation workshops on use pathways for leather offcuts, exhibitions to showcase successful resource recovery stories, and workspace redesign support through Kaizen principles.

1. Introduction

Poor waste management continues to feature as a crucial social problem today. To address this issue, modern waste management approaches call for closed-loop systems that extend material and product lifespan in a circular economy (Geissdoerfer et al., 2017). However, successful circularity will require an understanding of the transition roles of multiple actors, including producers whose activities and stances can have negative consequences if not managed properly (Wittmayer, 2026). Within the creative arts industry, for example, contributions to advancing environmental sustainability has included the conversion of waste materials into resources through artistic processes and product innovations. These creative reuse examples, include works by Ghanaian researchers (e.g., Awuni et al., 2023; Baah, 2023; Bonsu et al., 2024; Donkor et al., 2023) who have explored different ways for creatively transforming waste items like plastic bottles, wood waste and scrap metal, among others, into something useful.

Despite advances in the creative economy broadly, leather waste remains a relatively underexplored resource within sustainability and creative reuse discussions. Developing circular systems in the leather and leather products industry cannot be ignored because offcuts of production processes usually constitute 20% – 35% of leather used (Rethinam et al., 2014). Additionally, growing demand for leather goods (UNIDO, 2010) put pressure on raw materials obtained from livestock, creating competition among different users of hides and skins. Considering that increasing natural leather production has several negative consequences (Mwinyihija, 2010) there is a disincentive to more leather production; highlighting the benefits

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that circularity could provide to the industry. Unfortunately, empirical work by Arthur (2026) indicates the generation of large quantities of leather offcuts among footwear producers in Ghana during production. This raises a concern for environmental sustainability but also creates an opportunity for creative reuse.

Arthur (2025) found that more than half of the leather offcuts generated by footwear producers in Kumasi were free of defects and possessed physical characteristics that made them useful for reuse. However, most of these offcuts were mostly discarded as waste. This points to an important sustainability question: why do materials that have useful physical properties continue to be perceived as waste? This paper seeks to answer this question through the lens of the Theory of Waste Management (TWM) suggested by Pongrácz (2006). According to the TWM, the study hypothesizes that materials usually become waste when they lose perceived usefulness rather than physical functionality. This thinking aligns with arguments in circular economy principles that push for materials to be retained within productive systems through reuse, repurposing, and value recovery (Geissdoerfer et al., 2017; Kirchherr et al., 2017). Further, the TWM encourages proactivity in line with sustainable materials management practices where emphasis is placed on intentional actions within the life cycle of materials to preserve resources and decrease negative environmental impact (OECD, 2012).

Khorasanizadeh et al. (2019) suggest that value is a key distinguishing feature between waste and useful products. Therefore, if material and product owners, as proposed within the TWM, can restore the structure, state, performance and value of materials through the reassignment of purpose or repair, circularity could be achieved. This argument highlights the important role of the owner in the transition from waste to resource; and on to environmental sustainability. For waste to become a resource, the owner must first see its potential and be motivated to take action. However, the subject of value has not been explored properly in the waste management literature on the leather and leather goods industry; although the industry supports the livelihood of many artisanal small scale leather goods producers. This study bridges the gap by investigating the factors that influence how footwear producers' classify leather offcuts as waste or resource in two footwear producing hubs in Ghana.

2. Literature Review

2.1 Waste Management Approaches

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Over the years, the rationale for waste management has expanded from a focus on decreasing negative environmental effects only to include the preservation of depleting resources (Ordóñez Pizarro, 2016); and this shift has changed the way people think of the different waste management approaches. The EU advocates for the use of a waste hierarchy framework that emphasizes waste prevention as the most preferred approach to waste management, followed by minimization, reuse, recycling, energy recovery, and disposal in order of priority (Vats, 2016; Halkos and Petrou, 2018). Waste prevention focuses on addressing the waste management problem at the manufacturer level while waste minimisation concerns the efforts of consumers and retailers in the waste production process (Bortoleto, 2015).

Waste reuse also involves repeating usage of a product or material, after its first use for the same purpose for which it was produced, or for a different purpose that does not require reprocessing (Vats, 2016). Thus, waste prevention, minimization and reuse, unlike recycling, energy recovery and disposal usually occur before materials have been declared waste. Reike (2017) would consider these three approaches as value retention options that foster circularity; while some approaches at the manufacturing level (e.g., remanufacturing, refurbishing and repurposing) provide preferred shorter loops, others like recycling offer long loops. This study considers leather offcut reuse by footwear producers as repurposing – a waste management approach that occurs at the leather products manufacturing stage and should be encouraged in line with sustainable materials management principles.

2.2 Recycling for Leather Offcuts

Current studies on the use of leather offcuts have primarily highlighted recycling by second generation owners i.e. researchers. Nevertheless, their experiences can have significant implications for understanding usage possibilities. Among researchers, there is evidence of experimentation with processes, techniques and different types of leather scraps. Koparan and Harmankaya (2024) created different bag designs in an effort to transform leather waste into something useful. Karaoğlu (2021) also applied knitting techniques to convert leather pieces into vests while Özdemir (2023) recycled leather waste materials into handicrafts. These reuse approaches focused on smaller, functional and decorative items using non-scientific art-based methodologies.

In Ghana, Arthur (2021) extended the use of leather scraps beyond artefact creation among visual art students in a senior high school in Ghana. According to his study, usage

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practices transcended the execution of items like water bottle holders, jewelry boxes and sandal straps to serving as a material for experimentation and skill building as students used it for prototyping, testing of dyes, creating thongs for slit holes and practicing decorative techniques. In addition, Arthur (2025) also employed leather offcuts for two-dimensional artworks through mosaic and marquetry techniques. Here, reuse activities appeared varied and attempted experimentation with slightly larger artifacts. Despite the differences in reuse approaches, the above studies collectively show that the usefulness of leather offcuts may be tied to the knowledge, creativity, and opportunities available to potential users.

In all of the creative reuse examples, application was possible mainly because the researchers came up with their concepts after an evaluation of the wastes they obtained. Ashton (2018) calls this designing for waste – a concept that involves a systematic process of waste analysis to understand its characteristics and the subsequent design of creative concepts and models that make reuse possible. This approach made it easier to apply leather scraps of different sizes, shapes and colour to make new footwear designs or decorative parts like flower petals and ribbons that led to a 15% decrease in leather waste. Thus, Chen and Chen (2020) call for more experimentation with redesign methods that can help improve the utilization rate of leather scraps.

2.3 Factors influencing Leather Offcut Reuse

Literature on the factors influencing leather offcut reuse is limited. In one of the few studies available, Arthur (2021) found that material characteristics like size, shape, type, texture, and colour shaped student perspectives on the usefulness of leather scraps. Again, students in the same study reported that scrap size, availability of space to keep the offcut and the number of defects influenced their decision to use, keep, swap or throw away leather scraps. The students argued that leather scraps that had holes, were hard, brittle, too small, too thin, too thick, or mouldy were usually unusable. According to Ma et al. (2020), perceived value can be shaped, to some extent, by perceived costs and benefits. Thus, it may be possible that these students did not find value due to the perceived costs associated with restoration, among other things.

3. Method

3.1 Research Design

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The study used an interpretivist research philosophy and a qualitative research approach. Specifically, an exploratory research design (Creswell & Creswell, 2022) was employed to understand the factors that influence footwear producers' perceptions of leather offcut value.

3.2 Participants

Respondents comprised local footwear producers in major footwear producing hubs in Kumasi and Tamale. Participants for Kumasi were drawn from 10 cluster markets; namely, 31st, Abinchi, Asafo, Bantama, Mooro, Atonso, Pankrono, Akokodweso, Patasi, and Afful Nkwanta. Participants from the Tamale sample were footwear producers operating at home in the Hausa Zongo suburb. Sample size selection was guided by Adler and Adler (cited in Baker & Edwards, 2012) who proposed a sample of 12 to 60 as appropriate in qualitative research. Using snowball and purposive sampling techniques, respondents totalled 20 for Kumasi and 17 for Tamale. These sample sizes met the data saturation principles under the inductive, thematic saturation model by Saunders (2018) where no new themes emerged based on the researchers' judgement. Naderifar et al. (2017) suggest that snowball sampling works well when access is a challenge, which was the case for this study.

3.3 Instrumentation

Data was collected through open-ended questions in line with established practices for conducting semi-structured interviews. According to Creswell and Creswell (2022), interviews are ideal for qualitative data collection because they allow respondents enough room for free and detailed expression of opinions. Interview duration ranged from forty-five (45) minutes to an hour per respondent with follow-up interviews of a maximum of thirty minutes conducted where needed to clarify earlier responses or fill gaps identified during the initial analysis of the data.

Interviews were conducted in English and Twi depending on the respondent's language preference; and responses audio-recorded after permissions were granted. Following the interviews, audio files were saved in MP3 format on the researchers' laptop using a unique identifier for each respondent. Subsequently, interviews were transcribed using the basic level transcription method (Knight, 2018) where respondents' words were captured accurately; but with the exclusion of non-relevant words such as non-lexical sounds ("ah", "uh") and repetitions. For interviews conducted in the Twi local language, transcription occurred in English side by side

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translation as the researchers listened to the audio recording. Transcripts were then printed, and hard copy sheets were bound together to create a booklet for coding and analysis.

3.4 Data Analysis

Data analysis was guided by the qualitative data analysis process of data condensation, data display, and conclusion drawing suggested by Miles et al. (2020). Firstly, the volume of data on the printed transcript was reduced through open and coding by assigning labels to texts. Secondly, the output of the open coding was displayed in tables and diagrams to identify relationships and broader logical categories in relation to the inquiry through axial coding. This allowed the researchers to draw conclusions on emerging themes in line with thematic analysis principles (Grbich, 2013). Data analysis started side by side data collection and served the purpose of informing data collection in an iterative and reflexive process (Gray & Malins, 2004). Frequencies were used only to indicate the prevalence of perspectives and not for statistical inference. Maxwell (2010) explains numbers are useful, even in qualitative research to capture the distribution of observations and to establish internal generalizability – meaning inferences within the setting of your study and not on the applicability of your conclusions to other settings.

Trustworthiness in this study was established on the pillars of credibility, transferability, dependability and confirmability (Stahl & King, 2020). Credibility was established through data triangulation. This took the form of requests to observe leather offcuts, production spaces, use cases and footwear designs to better appreciate the responses given rather than include in the reporting. Preliminary findings were also shared with the respondents for validation. The methodological details provided in the research report also enhanced transferability while dependability was ensured through a peer review of initial codes and draft results after analysis. Additionally, confirmability by others is possible using the details provided on the population.

3.5 Ethical Issues

Data collection, analysis and reporting activities were guided by standard ethical principles. Footwear producer engagement was voluntary and participant consent was obtained before interviews were conducted. Participants were informed of the purpose of the study and the freedom they had to withdraw from the study at any stage without penalty. Data collected was kept private on a password protected laptop. Microsoft word transcripts were also password

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protected. To ensure confidentiality, participant identities were anonymized using pseudonyms with no personally identifiable information used in reporting findings.

4. Results

Findings from the study revealed that three things influenced the classification of leather offcuts as resource or waste among footwear producers in the study; namely, material characteristics, requirements for next production and storage space available. These are explained further per study area.

4.1 Responses from Footwear Producers in Kumasi

Results from the study indicated that only a few (8 out of 20) local footwear producers in Kumasi used the leather offcuts generated from their production activities. Among this number, usage was infrequent. Using phrases like "creating decorative designs on the footwear", "cutting thongs for joining", "lining the footwear and insole", "supporting the ends of crown metals", and "fixing fasteners such as buckles", respondents explained that leather offcuts served as a valuable material for making the small items needed during their production activities. Additionally, 3 out of the 8 footwear producers who converted leather offcuts into a resource explained how they employed them in children's footwear. According to these respondents, children's footwear required small parts which made leather offcuts a suitable low-cost material.

Regarding value, findings from the investigation revealed similar perceptions among most producers (18 out of 20) with responses highlighting the important role of size. Respondents argued that leather offcuts were not useful if they were not sizeable enough. This was explained through statements like "it is useful if I can mark and cut a pattern from it", "my ability to use the leather offcut depends on the pattern I want to cut" and "I cannot use it if I cannot mark or cut the new patterns needed from it". One respondent provided more insights on this issue suggesting that some leather types offered more opportunities for bigger leather offcuts that were useful. He stated:

"Leatherettes can be managed well because they are produced in large sheets, and we can arrange our templates well to minimise waste. Imported mineral tanned leather, on

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the other hand, is sold as scraps of varied sizes and shapes. Sometimes, we can only fit one or two templates on it and the rest becomes waste."

Another respondent clarified that pattern size was not the only thing that mattered. He explained that while being able to fit the pattern on the offcut was crucial, it was also important for footwear producers to ensure that they could find enough of the same leather offcuts to complete an order that required uniformity. To this end, a few respondents pointed out the need to consider other material characteristics like colour (3 out of 20), shape (3 out of 20), type (1 out of 20) and quality (2 out of 20) in determining the value of leather offcuts. Concerning colour, respondents described a need for leather offcuts that aligned properly with other leather pieces. Therefore, one respondent argued that because he sometimes used different colour combination designs in his footwear production activities, he usually kept leather offcuts for future use. Regarding quality, one of respondent reflected on a time when he bought leather offcuts that started peeling and breaking during the folding and hitting stage of the production process leading him to throw the leather away. Another respondent also explained how buying imported tanned leather in bulk can sometimes hide defects that make the leather useless.

Beyond material characteristics, a few respondents (6 out of 20) suggested that the value of leather offcuts was also driven by the needs of the next production cycle determined by order requirements, changing fashion trends (e.g., colour and design) and practices in the market. One respondent emphasised: 'if I have leather offcuts that will match my new work, I use it'. Another respondent also explained that when leather offcuts with specific designs are no longer in demand, they become worthless. For a few others (5 out of 20), offcut value had nothing to do with the leather but rather their space capacity. One person indicated how he usually threw away all his leather offcuts due to his unwillingness to keep something he may not use that will take space. The others mentioned that they kept offcuts perceived as valuable for a period, ranging from a day to a fortnight; and will discard afterwards to create space. To them, storing the leather offcuts required proper care and maintenance to remain valuable; hence, as one person put it, if he cannot find anything meaningful to do with it within the period then he will discard it.

Among some of the respondents (3 out of 12) who did not use the leather offcuts, non-use was due either to a perceived lack of need because there was enough money to buy new leather, or limited requisite knowledge and technology for reuse. One respondent had been exposed to advanced recycling techniques through a documentary where straw was used to create a sewing thread. Another respondent had heard of recycling activities like reprocessing

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leather into boards and fertilizer. However, both respondents felt that reuse and recycling of the offcuts were out of their reach because they did not have the needed infrastructure. Findings also showed that leather offcuts were also sometimes donated to catapult producers and other children's footwear producers; an act that was perceived to one day cause the beneficiaries to reciprocate the kindness showed.

4.2 Responses from Footwear Producers in Tamale

Responses from the investigation indicated that most (15 out of 17) of the local footwear producers in Tamale reused their leather offcuts; but this was done on an irregular basis. Employing techniques like braiding, thonging, and joining, the respondents explained how they used leather offcuts to support footwear production activities. Specifically, offcuts were salvaged to make "crown design", "thongs", "nose of slipper", and "lining" among most of the footwear producers. Only three respondents mentioned that they used leather offcuts to make children's sandals and slippers. One of them explained: "because I deal mainly in children's footwear, I usually need small pieces, so I keep the leather offcuts". Further, two of the respondents highlighted that they reused leather offcuts for talismans and key holders.

Concerning the factors influencing offcut value, size again featured as the most significant factor among all participants. This was evidenced in statements like these: "if I can draw and cut a pattern from the offcut, I keep it"; "when the size of the leather offcut is too small, I dispose it"; "I keep the big pieces and throw away the small ones that will not serve any purpose"; and "I place the pieces on my template and if it will fit, then I consider it useful". Nevertheless, one respondent emphasised that he considered the time it will take to work with the waste, in comparison to using new leather sheets, when making usage decisions about the offcuts.

Other material characteristics like colour and texture also came up as important things to think about in determining the value of leather offcuts. These features were also connected with the requirements of the next production cycle as respondents (4 out of 17) explained the need to keep the offcut if it would be useful for completing the "next contract", "future work", or "new job". Additionally, some explained that leather offcuts that were attractive or scarce were worth keeping. As one person put it, "khaki-coloured leather can be difficult to get, so it is important to keep its small pieces". Another respondent also indicated the importance of quality as a factor for determining usefulness. He explained:

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"We do not have control over the quality of leather available at the market. Sometimes what is on sale has holes, scratches, and marks; but you must buy it because that is what exists. In this case, parts that are not of good quality are cut off and thrown away."

Another respondent expounded: "when leather pieces are kept and there are colour changes, they cannot be used again". Further, a third respondent highlighted that leather pieces could harden over time, in which case it cannot be used.

The issue of storage space also came up in discussions with participants as a contributing factor to leather offcut reuse. This was visible in comments like: "because we work in front of our house, we keep the materials we work with in a box, so we must consider if we need the pieces or not" and "if you see that you have stored the leather offcuts for some time, but the usage is less, you have to throw it away and manage space". In instances where keeping leather offcuts was a challenge, some respondents donated them to talisman and children's footwear producers as well as shoe repairers either for free or for a small token.

5. Discussion

5.1 Cross Case Analysis

Usage practices in Kumasi mirrored that in Tamale with only slight differences. However, conversion of leather offcuts into something useful was more prominent among local footwear producers in Tamale than in Kumasi. In both environments, leather offcuts were employed only occasionally and tied to supporting footwear production activities. Specifically, leather offcuts were used primarily for decorating the footwear, making fasteners, or supporting production processes; with a few use cases centered on the production of small leather artifacts like talismans, wallets and key holders. For local footwear producers in Kumasi and Tamale, usage of leather offcuts depended on three main factors: namely, offcut characteristics, requirements for next production and storage space available. Regarding characteristics, size dominated in both study areas although other features like colour and texture were mentioned. Only in the Tamale case did respondents refer to leather quality as an important characteristic for determining the usefulness of leather offcuts. This result may be due to the dominance of vegetable tanned leather use among the footwear producers in Tamale. These were usually produced by local tanneries who lacked appropriate technologies to meet high quality standards. Further, animals in Ghana are not reared for leather but for meat; therefore, care is sometimes not taken to

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ensure breeding and animal handling strategies that minimise ante mortem and post-mortem defects.

The issue of limited storage space identified in the two cases is not surprising. This is because, the footwear producers in the study exhibited traits of micro and small enterprise owners with limited resources to enable big shop space rentals. Despite this constraint, the study found that local footwear manufacturers in Tamale were able to keep their leather offcuts for longer periods (i.e., up to a month) than producers in Kumasi who kept their offcuts for a maximum of two weeks. This difference may be due to locational factors as respondents in Tamale worked from home and could turn to home storage spaces if needed to keep leather offcuts for longer periods.

5.2 Value comes from social construction

Although material characteristics came up as a factor that is considered in determining the value of leather offcuts, it appears that these were only relevant in the context of specific intended uses. Therefore, material characteristics like size, shape, colour and quality only served as a means to an end. As footwear producers in the study interacted with each other and with their work, they created a shared definition of waste, which assigned value to functionality rather than the true characteristics of the leather offcuts they generated. As a result, leather offcuts transitioned into waste that was mostly disposed and was never discovered by other users, though in good condition. Through the lens of Pongrácz's (2006) TWM, leather offcuts became waste not because they were inherently unusable but because users no longer perceived a role for them. From an environmental sustainability perspective, this constitutes a missed opportunity for waste prevention, minimisation or reuse – waste management approaches that encourage action before materials actually became waste (Bortoleto, 2015, Vats, 2016).

5.3 Narrow framing of usage possibilities

Another theme that emerged from the study is the narrow framing of usage possibilities within the functionality motive driving the perception of value. It was apparent that producers evaluated leather offcuts against a limited set of applications within the footwear production space. Consequently, leather offcuts that did not fit use cases within this context and were viewed as having little value despite remaining physically usable. This approach to using leather offcuts contrasts that adopted by Ashton (2018) who used leather offcuts creatively within

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footwear production. While Ashton (2018) employed a non-traditional reverse logistics flow model to create footwear designs so that he could leverage the characteristics of waste available to him, respondents in this study worked with already existing designs and mapped this on to the leather offcuts available to see if they could find anything useful. Use case ideas around prototyping and practicing techniques (Arthur, 2021), though applicable in footwear production, may not have come up because while students operate in environments that foster learning through experimentation, footwear producers play in a space where efficiency and economic benefits are paramount. It could also be possible that the fixation on applications within the footwear industry limited usage options as several of the creative reuse examples presented earlier (Arthur, 2025; Koparan & Harmankaya, 2024; Özdemir, 2023) experimented with varied functional and decorative items for different markets (e.g., fashion, handicraft and household items). These arguments suggest multiple root causes which may include limited creative capacity or an unwillingness to try new things, among other things. The latter could have negative implications for environmental sustainability as Wittmayer (2026) explains that entrenched positions among actors could affect transition dynamics and direction.

5.4 Practical Considerations as Constraints in Resource Retention

A final theme emerging from the results is the important role of practical considerations in influencing the classification of materials as waste or resource, at least in the context of this study. References made to storage space and future production needs imply that decisions about keeping or discarding leather offcuts were influenced by operational realities which should not be taken for granted. This finding aligns with the thinking of Ma et al. (2020) on how perceived benefits and perceived costs influence the perceived value of waste. Keeping leather offcuts for longer periods could mean additional maintenance costs to footwear producers. Also, possible costs associated with limited storage could have served as a barrier to leather offcut utilization; highlighting costs and benefits trade offcuts.

6. Conclusions and Implications

This study sought to investigate the factors that influence the classification of leather offcuts as waste or resource among footwear producers in Ghana. Based on the findings, the study concludes that leather offcuts become waste not because they lack utility, but because

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perceptions of value are shaped by existing production practices which constrain use case possibilities within an operational environment that discourages their retention and reuse. It is important to note that these findings may not fully reflect the perceptions of all footwear producers in the study areas as the research focused only on selected production clusters. Additionally, it possible that participant's responses may not always align with their actual practices. Although measures were put in place to triangulate responses, this was not always possible for some of the respondents.

The significance of the study is that it shifts attention from a focus on materials in the waste to resource literature to the social and practical contexts within which value is assigned. If owners do not find value, moving production residues like leather offcuts into resource will be difficult. Thus, the transition to environmental sustainability and circular economy, in the context of this study, may require more than education on waste recovery techniques to addressing the perceptual barriers around leather offcut value. This could take the form of awareness creation workshops on use pathways for leather offcuts, exhibitions to showcase successful resource recovery stories to make the benefits tangible, and the provision of workspace re-design support to help footwear producers maximize the limited space they have. Training on Kaizen principles, for example could be useful in this regard.

For recycled artists, this conclusion from this study creates an opportunity. While large volumes of potentially useable leather offcuts exist, there is also the tendency to gain increased access to these leather offcuts as footwear producers may be willing to give them away at low or no cost. For researchers, there is still a need to experiment with low-tech creative approaches for reusing leather offcuts that align with the needs and characteristics of footwear producers. This can contribute to providing win-win benefits to the environment and to the economic empowerment of footwear producers. For policy makers, there is a need to be intentional in designing waste reduction interventions that not only build capacity in creative waste management practices, process and techniques; but also tackle the sub-optimal conditions that shape disposal decisions. Additionally, it is important for waste reduction interventions to introduce mindset development initiatives that demonstrate the value of leather offcuts.

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Author Bionote

Albert Kwame Arthur holds an MPhil and PhD in Arts and Culture from the University of Education, Winneba (UEW). He is a lecturer, at the Department of Art Education, UEW, who specialises in indigenous leather art and practice-led research. Albert is passionate about developing art students' capacity to convert their skills to solving societal problems and gaining financial independence.

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