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Exploring leather offcuts for two-dimensional artwork

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Abstract: The leather footwear industry can contribute positively to economies at micro and macro levels. Nevertheless, its activities constitute a growing problem to society due to its toxic solid waste generation potential. Therefore, there is a need to explore ways of creating a positive net effect for stakeholders in the industry. This study investigates how leather offcuts can be made valuable by using mosaic and marquetry techniques. The study employed a practice-led approach underpinned by an art experimentation design. Reflective journaling served as the means for collecting data while data was analysed using thematic analysis techniques. Results show that leather offcuts offer the colour variations needed for marquetry art and can be shaped into the right sizes for mosaic art. However, whereas quality is irrelevant in determining the usefulness of leather offcuts for mosaic art, quality can influence the extent to which leather offcuts can be used for marquetry. Thus, the study concludes that leather offcuts are suitable for two-dimensional art with some limitation based on offcut characteristics and desired technique. Further exploration with leather offcuts for different 2D techniques and artwork types is recommended in future studies.

Keywords: Leather, Marquetry, Ghana, Mosaic, Offcuts, Recycled art, Two-dimensional art

1. Introduction

The increasing scale of waste generation over the last decades has called for an intentional approach to waste management. For many artists globally and locally, this has presented an opportunity to rethink new strategies for incorporating waste into art (Akpang, 2013). Aykanat (2014) argues that waste is a useful raw material for art. According to Umoru-Oke and Adekanmbi (2018), common waste types used by artists include plastic bags, car tyres, used recharge cards, bottle corks, discarded beverage cans, and electronic waste. Through recycled art, artists are able to create value for things that were once considered valueless. On one hand, leatherwork artists have the potential to decrease chemical tanning processes by extending the life span of already processed leather through reuse (Business Recycling, 2018). On the other hand, offcut recycling could provide economic incentives to leatherworkers considering the expensive nature of leather today. Despite this, only few studies have investigated recycled art, especially in the leather industry.

Kushwaha and Swami (2016) and Stan et al. (2014) conducted practice-based studies that used leather offcuts to produce household items and fashion accessories. While their investigations showed that leather offcuts worked well for functional artworks, its usage was limited to small three-dimensional artifacts in line with earlier studies conducted by Arthur (Arthur, 2021). A review of the literature suggests a narrow focus of recycled art activities in Ghana on specific waste types like wood, paper and plastic among others. Arthur (2025) investigated ways by which footwear buffing dust could be used for sculpting. Similarly, Amissah, Adom and Adu-Gyamfi (2022) explored ways of using palm kernel waste as an alternative sculpture material to improve environmental sustainability. Awuni, Tabi-Agyei, Baah and Adom (2023) also used wood waste to create doors while Opoku-Asare and Yeboah (2013) used pulp fabric waste to make paper. Yeboah, Asante and Opoku-Asare (2016)

additionally employed plastic waste to create instructional materials for teaching and learning in primary schools.

This paper argues that there is a need to explore additional ways of using leather offcuts, especially in new contexts. By creating wall hangings using mosaic and marquetry techniques, the study explores new uses for leather offcuts to understand its suitability for two-dimensional art. Emphasis is placed on investigating the effectiveness of these techniques in reducing residual waste in the art production process as studies by Umoru-Oke and Adekanmbi (2018) indicate high levels of residual waste generation by artists in their production process.

2. Literature review

2.1. Uses of leather offcuts

Different researchers have tried new ways of using leather offcuts. Whiles some have used scientific approaches, others have mainly repurposed leather offcuts for new things. Kowalski's (1997) and Jiang et al. (2016) for example, found ways to extract essential chemicals from leather offcuts to produce fertilizer and tanning agents. Balamurugan et al. (2014) also figured out a way to use leather offcuts for pavement blocks. Additionally, other studies have investigated technologies for making blended fabric from leather offcuts (Rethinam et al. (2015) and food flavourings from amino acid extracted from leather scraps. Further, Yilmaz et al. (2007) showed that leather offcuts can be treated to make fuels and activated carbon. Although these approaches to using leather offcuts are innovative, they require specialized knowledge and technological infrastructure which are not always available. According to Kushwaha and Swami (2016), non-scientific approaches to using leather offcuts provide dual benefits of environmental care and job creation for the recycled artist. Such approaches consider a non-invasive way of reducing raw material consumption, while at the same time creating fashion and leather accessories that can be sold at a premium (Stan et al., 2014). To Teklay et al. (2018), recycling through scientific and non-scientific approaches can be used together for optimum outcomes. This benefit was observed in their study where scientific techniques were first used to create leather composite sheets which were then converted into items like computer accessories and interior decoration items through non-scientific means.

When using non-scientific approaches, Ashton (2018) suggests a need to be intentional in designing for the waste rather than using the waste for just anything. He shows in the case of a children's shoe manufacturing company that leather offcuts are maximised when their characteristics (for example, colour, quantity, size) are analysed and the insights used to plan product development. In his study, large-sized leather offcuts were used to create new footwear models while small-sized offcuts served the purpose of decorative items on the footwear leading to a 15% decrease in weekly waste disposal. Thus, they were intentional in designing footwear types that required small decorative pieces to make the small-sized leather offcuts relevant. Although a 15% decrease in waste due to reuse is good start, there is a need to explore additional strategies that can reduce residual waste even further. Perhaps, reusing leather offcuts for non-footwear related items could help artists achieve this goal. To date, dumping at landfills continues to be the norm; and this is an unsustainable practice that should be curbed (Yilmaz et al., 2007).

2.2. Techniques for two-dimensional art

Two-dimensional (2D) art differs from three-dimensional art, in that it combines different artistic elements to create designs that depict only length and breadth. Therefore, 2D artworks look flat on a support and can be obtained using various techniques like drawing, painting, printing, and photography among others (Blobner, 2016). Traditionally, these techniques involve the use of wet and dry media like water colour, pen and wash, charcoal and crayon. However, recent studies have shown the possibility of adopting new media like stones, shells, fabric and wood (Seitz, 1961; Maraffi, 2016; Allahverdiyev & Yucesoy, 2017) either as stand alone or in

combination to create 2D art through a process of assemblage i.e., pulling together cut pieces of materials (Seitz, 1961) using techniques like mosaic and marquetry.

Mosaic art stems from glass art and is based on the concept of cutting and pasting of small pieces, known as tesserae, on a support to create an image. Tesserae can have different shapes and sizes as determined by the artist; however, global manufacturers offer square, oval, round and irregular shaped mosaic tesserae with sizes ranging from 10mm by 10mm to 23mm by 40mm (SICIS, 2005). Mosaic tesserae can have multiple finishing surfaces which could be derived from the type of material used. However, these varied surface textures are not always visible upon first look of a mosaic art because of the emphasis it places on the larger image. Mosaic tesserae are arranged in a manner that ensures flow in the artwork (Office of Literacy and Essential Skills, Canada, 2010) through patterns. While the andamento style features grid-like patterns in the artwork, the Opus Regulatum style showcases horizontal or vertical patterns and the Opus Vermiculatum style highlights worm-like patterns along the curves of the image. (Drostle, 2008). These techniques can be combined in an artwork to depict what is referred to as the Opus Classicum technique (brick-like pattern in the background and worm-like style for the image (Drostle, 2008). Irrespective of the patterns adopted, most mosaic art usually display grout lines that emerge as tesserae are placed side by side each other with spaces in between. Mosaic art is a skill; and artist need to master how to manage row widths and spaces between tesserae to accurately depict an image (Office of Literacy and Essential Skills, Canada, 2010).

In contrast to mosaic, the marquetry technique relies on colour tone gradation to depict images. The technique takes inspiration from wood art (Ozarska, 2013) and dates back to the renaissance era (Edwards, 1993). Originally, it was based on the principle of assembling contrasting layers of veneer to create patterns in a predetermined image (Ozarska, 2013). However, artists today have figured out ways to use other materials like leather instead of wood for marquetry art. In both cases, emphasis is placed on combining different sized, shaped and coloured pieces of the chosen media in a jig-saw like puzzle pattern to create an image (Edwards, 2012). Thus, the marquetry process first starts with designing the puzzle, cutting out puzzle pieces and assembling the pieces on the support to fit the puzzle design (Edwards, 1993). Puzzle pieces in marquetry generally have curved edges with contrasting colours (Edwards, 1993). In instances where colour contrast is not significant, techniques like hot sanding can be useful. From the review above, we can observe that the mosaic and marquetry techniques to 2D art production require materials that allow for easy shaping and fastening; with an added layer of colour contrasting for marquetry. The question of whether leather offcuts from footwear producers in Ghana lend themselves to these characteristics is one yet to be explored.

3. Research methodology

3.1. Research approach, design, sampling, data collection and analysis

This study is guided by methodological assumptions proposed by Gray and Malins (2004) for practice-led research. The study is described as practice-led because it uses creative work production as a means to generate data for analysis (Gray & Malins, 2004; Barret, 2007). Although practice-led research has links with the qualitative research approach (Stewart, 2006), Haseman (2006) argues that it differs from qualitative research. This may be because it is based on the epistemological stance that some knowledge can only be gained in and through practice (Painter, 1996, as cited in Piccini, 2004). This study adopts Raes's (2014) experimental art design. By playing with new media and techniques in 2D art production, the study address key gaps in recycled arts through practice and subsequent reflections on the artwork production process (Skains, 2018). The outputs of the creative artwork in this work served only as reference point for learning about leather offcuts and the 2D techniques adopted. In other words, practice was used as a data collection instrument to explore new leatherwork practices with the researcher facilitating both the creation of the artwork and the creation of relevant knowledge (Gray & Malins, 2004).

Leather offcuts used in the study were collected from footwear producers in two major cities in Ghana known for their active participation in leather making and leather craft production. Kumasi was selected for its high use of imported chrome tanned leathers for footwear production. Footwear producers in Tamale also offered opportunities to explore locally produced vegetable tanned leather for the study. A total of 13kg and 9.6kg of leather offcuts was collected from producers in Kumasi and Tamale respectively. Leather offcuts used for the study were sampled purposively from the leather offcuts collected on the basis of grain surface quality, shape, size, type, and colour (see Figure 1) as required for each artwork production following an analysis. Using a magnifying glass, inspections revealed that two thirds of the leather offcuts were free of defect and suitable for reuse. Defects identified on the remaining one-third included dirt stains, hardened glue, paint spills, pen and pencil marks, cuts, holes, scratches, peels, creases, and fold marks. Most of the leather offcuts were irregularly shaped. While some had zig-zagged or curved edges, others came in a U, V, L, or arrow-shaped form. A few rectangles, triangles, trapeziums, semicircles, squares, and ellipses were also identified.

Figure 1: Evidence of sorting and analysis of leather offcuts

Source: Researcher, 2021

Size classification was done by mapping the sampled leather offcuts to cardboards depicting three different size categories: namely, small, medium, and large. Vincent, Bruijn, Wijskamp, Rasheed, van Drongelen and Akkerman (2019) explained that while small offcuts had widths and lengths less than or equal to 60mm and 150mm respectively, medium-sized offcuts had widths of between 60mm and 160mm and lengths of between 150mm and 420mm; and these dimensions guided the classification. Most of the offcuts fell within the mid to upper limit of the medium-sized category. However, the analysis revealed the presence of small to tiny pieces of leather offcuts ranging from 5mm to 30mm wide and connected to small triangles. Through direct observation, the researcher observed that leather offcuts collected from footwear producers in Kumasi were either chrome-tanned or leatherettes imported into the country with the latter slightly more in terms of quantity. In contrast, the offcuts from footwear producers in Tamale featured only vegetable tanned leather.

Observation also revealed the availability of single, dual, or multi-coloured leather offcuts in the sample collected. The colour brown dominated in the sample from Kumasi with over fifteen (15) shades of brown (for example, coffee brown, chocolate brown, light brown, deep brown, and medium brown) observed. In the sample from Tamale, reddish wine was predominant followed by reddish brown and coffee brown. Black was the next popular single colour although other colours like gold, red, ash, khaki, white, grey, silver, cream, purple, orange, blue, pink, green, and yellow in different shades were discovered. Data collection took the form of reflective journaling (Gray & Malins, 2004) on happenings during the artwork production process and on creative outcomes. Data captured in the reflective journal was analysed thematically through a process of reduction, display and verification (Miles & Huberman, 1994).

3.2. Details of studio work conducted

In order to explore the suitability of leather offcuts for 2D art, the research created two different artworks. The first was a leather mosaic artwork that depicted a female wearing a nose mask and the words “wear your nose mask” inscribed below the face. The second 2D artifact was a leather marquetry piece displaying a human hand

being washed at a tap under running water into a wash basin with the writings "wash your hands frequently with soap under running water" below. The production process for each artwork is described below.

3.2.1. Two-dimensional Leather Mosaic Artwork

The leather mosaic artwork was constructed using the principle of assemblage. Tools employed included basic cutting, measuring, writing and painting tools (for example, knife, scissors, steel rule, pencil, brushes, sandpaper), and a grinding machine. Primary materials used comprised leather offcuts, plywood as support, and bonded glue. The following provide a step-by-step explanation on how the artwork was constructed.

1. Production started with selecting the theme and image for the artwork.
2. Next, a decision was made about the colour scheme to use based on the image for the artwork. Leather offcuts were then selected on the basis of colour and surface quality to obtain a sample that could enable the depiction of different tones in the image i.e. from dark to light. Leather offcuts of all shapes, sizes and types were considered so long as they met the colour and quality criteria.
3. The surface of the plywood was smoothened using a grinding machine and two types of sandpaper. The 80-grit sandpaper was used to remove imperfections on the support while the 120-grit sandpaper was applied to give a smooth finish and improve adhesion.
4. The composition of the artwork was then drawn unto the plywood using the scaling technique.
5. This was followed by the sorting of sampled leather offcuts, cutting of these into tesserae and storing separately based on their characteristics.
6. Execution of the artwork then started by assembling leather tesserae on the support through gluing. Starting with the outfit in the image through to the shoulder and then to the face, tesserae of different colours and sizes were placed skilfully, being guided by an outline of the image.
7. Execution of the artwork then shifted focus to the background design as leather tesserae were glued together to depict tonal gradation to bring out the image properly.
8. Construction of the inscription followed. The text "Wear Your Nose Mask" was cut out from a strawboard and concealed with leather pieces. These were then fastened onto the plywood.
9. Next, the complete artwork was inspected to identify faults and address them.
10. The production process ended by finishing the artwork with lacquer and fixing it in a wooden frame. (See Figures 2 and 3 for a visual representation of the mosaic art production process).

Figure 2: Evidence of the leather mosaic artwork process

Source: Researcher, 2021

Figure 3: Final leather mosaic artwork

Source: Researcher, 2021

3.2.2. Two-dimensional leather marquetry work

The leather marquetry work was executed using sandpaper, tracing paper, pencil, grinding machine and soldering iron. Key materials employed included plywood as support, leather offcuts and bonded glue. The following steps summarize the production process.

1. Artwork construction kicked off with theme and image selection and analysis (using adobe photoshop) to identify the relevant colour tones required.
2. This was followed by offcut selection based on the colour size and surface quality. Leather offcuts of all shapes and types were considered so long as they met the colour, size and quality criteria.
3. Afterwards, the surface of the plywood was prepared through smoothening with a grinding machine and two types of sandpaper. The 80-grit sandpaper was used to remove imperfections on the support while the 120-grit sandpaper was applied to give a smooth finish and improve adhesion.
4. The design of the composition was outlined unto tracing paper and then transferred from the tracing paper unto the support. These took the form of puzzle-like pieces joined to create a whole. Additionally, areas of the support for pyrography were identified.
5. The puzzle-like designs on the support were then inspected for precision. Puzzle segments were assigned specific leather offcut colours using numbers. Leather offcuts that matched each colour category were sorted and stored separately.
6. Execution of the work started with implementing the pyrography technique in areas earmarked for this purpose like the wash basin.
7. Following, each piece of the puzzle was traced on tracing paper and used as a guide to cut the leather in the appropriate colour category into the required shape. For puzzle pieces that were large, multiple leather pieces were combined to complete the shape of the puzzle piece. Cut pieces were pasted in the corresponding segments of the image immediately they were cut with the help of an adhesive to start building the image. Cutting and pasting of puzzle pieces continued until the entire image and background designs were complete.
8. Next, a stencil was created to capture the text inscription and this was used to print the text at the designated place on the artwork using acrylic paint and a squeegee. The work was then air dried.
9. Production ended as lacquer was applied to the artwork and framed (see Figures 4 and 5 for a visual representation of the marquetry art production process).

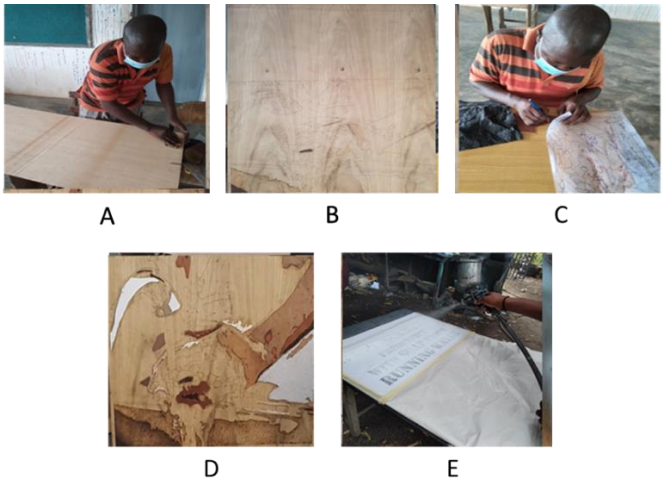

Figure 4: Evidence of the leather marquetery artwork process

Source: Researcher, 2021

Figure 5: Final leather marquetry artwork

Source: Researcher, 2021

4. Results

The results of the study are based on key questions the researcher sought to understand while producing the mosaic and marquetry artworks. Specifically, the study sought to shed light on 1) whether leather offcuts offer enough colour variation and sizes to depict tonal gradation in marquetry art, 2) whether pyrography and printing could be combined with leather marquetry to improve the aesthetics of the artwork, 3) how leather offcuts should be handled (i.e. required sizes and arrangement patterns) in mosaic art to accurately depict a composition, and 4) whether leather offcuts could be used without residual waste in the 2D artwork execution.

Findings showed that leather offcuts obtained presented enough colour variation to depict tonal gradation in the marquetry work. Prior characterisation of the offcuts helped the researcher and assisting artist identify a predominance of different shades of brown in the offcuts sampled and this guided the artwork composition in terms of colour. However, results from the exploration also showed limitations in finding the right shades of brown in large quantities to fill each puzzle shape in the composition. Thus, it was not always possible to execute the intended image exactly in terms of colour in the actual artwork. A typical illustration of the effect of this finding is seen in Figure 6 where although the researcher and assisting artist intended to use a light brown shade of different leather types for one of the puzzle pieces, this shade was not available in the right quantities leading to the use of multiple, smaller sized offcuts of varied shades of brown. This altered the original design as it introduced additional lines into the artwork and created smaller puzzle pieces instead of one large one.

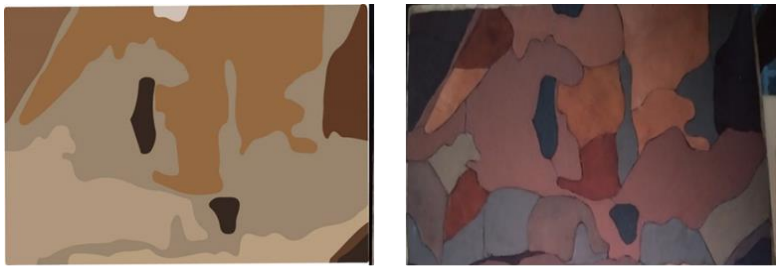

Figure 6: Marquetry composition on computer (A) against actual artwork (B)

Source: Researcher, 2021

Regarding the extent to which pyrography could be combined with leather marquetry, the exploration showed that this was possible. The researcher and the assisting artist started first by applying the pyrography technique to depict the sink basin in the composition before executing the leather marquetry technique. However, upon completing the artwork, observation revealed that the sink basin was slightly hidden and required additional scorching. Considering that synthetic leather dominated the leather offcuts used and were prone to burning if heat was applied, the researcher chose to explore black colour pencil shading to intensify the shade of colour and this worked well. Combining pyrography and colour pencil shading solidified the work and made it more visible to ensure a good blend with the leather marquetry artwork. Concerning printing, the study revealed that although the artwork had different textures, stencil printing was possible as the text "Wash your hands frequently with soap under running water" stood out clearly with no defects (see Figure 5 above).

Exploring mosaic leather art revealed some interesting outcomes. First, the study showed that leather tesserae needed to be cut into smaller than normal pieces (in most cases between 4 mm to 10 cm on different sides) and arranged contrary to the side-by-side patterns without grout lines to accurately depict the image (see exhibit A in Figure 7). This led to the creation of a relief effect on aspects of the work like the forehead where leather tesserae needed to be arranged on top of each other to improve solidity (see Figure 8). Although the literature suggests that leather is a flexible material, cutting the leather offcuts into smaller pieces was a challenge. Most of the offcuts obtained had lining at the back making it thicker and difficult to cut, especially for smaller-sized leather offcuts. Thus, the shears emerged as the most appropriate tool for cutting instead of a standard scissors. Picking of leather tesserae for gluing was also a struggle due to their small sizes thereby requiring the use of a broomstick as an improvised tool.

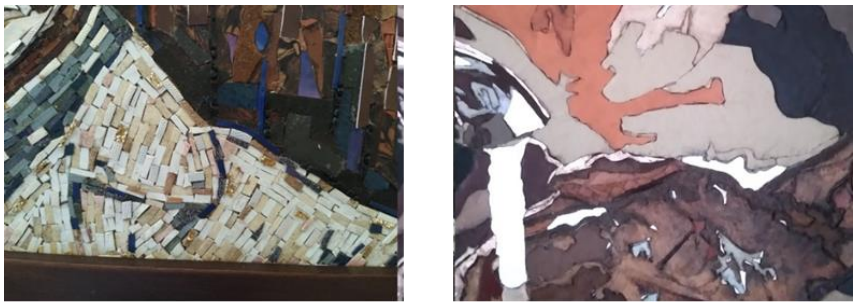

Figure 7: Size of tesserae (A) vis-a-vis size of puzzle segments (B)

Source: Researcher, 2021

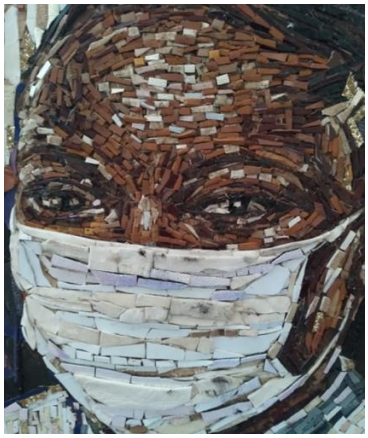

Figure 8: Relief effect in the leather mosaic artwork

Source: Researcher, 2021

In both marquetry and mosaic artworks, the researcher and assisting artist found that the flesh side of the leather offcuts sometimes offered a better alignment with colours required to depict aspects of the artwork. This created an opportunity to use both the grain and flesh sides, though unusual, in the artwork production. As a result, varied texture effects ranging from glossiness to matte feel and different levels of smoothness were observed. Results from the study indicated that although colour availability in the right quantity was significant for effective leather marquetry art, it was not a factor of concern for mosaic leather art as the small sizes of the leather tesserae made the colours not very visible. Additionally, the study showed that cutting was inevitable in using leather offcuts for mosaic and marquetry art. Nevertheless, whereas cutting for mosaic art was focused on getting small leather tesserae, cutting for marquetry art needed to be guided by a pattern.

5. Discussion

The study has shown that leather offcuts can be used for 2D artwork production using the principle of assemblage suggested by (Seitz, 1961). Despite the challenges associated with finding colour shades in the right quantity, the leather marquetry art produced in this study featured standard marquetry art characteristics like the jigsaw puzzle pattern mentioned in literature. (Edwards, 2012; Ozarska, 2013). Pyrography worked similar to the hot sanding technique to create an artwork that mimicked the features of wood art (Edwards, 1993). The mosaic artwork also exhibited the characteristic of fluidity in traditional mosaic arts (Office of Literacy and Essential Skills, Canada, 2010). However, laying patterns like the grid-like and worm-like arrangements highlighted by Drostle (2008) as key characteristics of mosaic art were not evident in the leather mosaic artwork produced in this study. Instead, the leather mosaic art in the study featured arrangements with no distinct patterns with uneven and less visible grout lines. Additionally, the mosaic depicted a rough and relief surface in contrast to the flat nature of other mosaic artworks.

Although leather offcuts worked for executing both the mosaic and marquetry techniques, findings from the study revealed different levels of suitability worth noting. On one hand, the marquetry technique required leather offcuts that had a good surface quality (for example, free how holes, cuts, scratches, stains, marks and wrinkles among others) and were large enough (typically between 50 mm to 200 mm) to allow for trimming to fit specific irregular puzzle-like shapes. On the other hand, leather offcuts of different sizes and quality worked well for the mosaic technique because they were cut even smaller (typically between 5 mm to 10 mm) such that defects were not visible. Nonetheless, the mosaic technique featured as the most arduous. In executing both techniques, planning in line with the process suggested by Ashton (2018) was useful in ensuring the efficient use of waste. Overall, it could be argued that the mosaic and marquetry techniques facilitated waste management through reuse of leather offcuts for recycled art. Whereas mosaic art allowed for the elimination of residual waste

because all the cut pieces could be used to depict the image, marquetry created more residual waste in line with arguments by Umoru-Oke & Adekanmbi (2018).

6. Conclusion

This study investigated the suitability of leather offcuts for two-dimensional artwork using the mosaic and marquetry techniques. Findings from the study led to the conclusion that leather offcuts are suitable for two-dimensional art with some limitations based on offcut characteristics and desired technique. While colour variety is a key characteristic irrespective of the technique, surface quality is crucial especially for the marquetry technique because puzzle piece sizes are big; thus, making defects more visible. The study recommends additional exploration of leather offcuts for art compositions of different sizes and for other 2D art techniques, by researchers, to better understand the scope of its use. Additionally, recycled artists should harness the potential that leather offcuts can offer in using waste as resource. This will require an understanding of user perception about the artworks and their perceived value. Recycled artists should conduct a cost benefit analysis of 2D recycled leather art.

7. Contributions of the Study

This study makes contributions to knowledge in three areas. First, the study provides insights into how leather offcuts can be used for mosaic and marquetry art; thereby providing guidance to help other artists. Second, the study brings to the fore new variants of the mosaic and marquetry techniques in leatherwork. Although the artworks were only used as a means to an end, interesting features like the unique texture effects obtained from using the grain and flesh side of the leather concurrently, overlapping relief-like surfaces and the rise and fall feel of employing leather with different thickness cannot be overlooked. The study has shown that leather offcuts have the potential to expand the scope of colour options and aesthetic appearance in 2D art. Additionally, the study has also confirmed that leather marquetry can be combined with other techniques to create mixed media art. Finally, the study establishes that recycled art could be a useful approach to managing solid waste. In doing so, there is a need to plan for the waste to reduce residual waste generation.

8. Implications of the study

The extent of work that went into the production of the artworks, especially in cutting and assembling leather tesserae or puzzle pieces suggest time implications that can affect the affordability of the artwork produced. Whereas the mosaic and marquetry techniques worked well for the 2D artworks production, there is a need to consider whether the time invested in producing the artworks is worth investing. In other words, it is important to understand whether recycled artists using these techniques can get economic value that is commensurate with the resources invested without appearing uncompetitive in the market. Perhaps, the unique texture effects observed from using leather offcuts could be leveraged to target high end clients willing to pay a premium to ensure financial viability.

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