Utilization of beverage cans waste as innovation of Balinese bride accessories in new normal era

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Abstract. Cans are non-organic wastes that are difficult to destroy and can pollute the environment. The solution in this new normal era is by recycling cans waste into innovative for Balinese bridal accessories so that they have aesthetic value and increase selling value. The objective of the study was to determine the engineering of the waste of beverage cans as an innovative Balinese bridal accessory. The research method used the experiment, observation, documentation, descriptive analysis with sensory tests and preference tests. The results of the validity showed that all products received a very valid criteria, the highest value was obtained by the flower cap accessories 95.8%, the lowest value obtained by the Puspolembbo accessories and the Nagasastra bracelets 83.3%. The sensory test results showed that the eight products are very feasible and the two products are feasible with an average of 87.5%. The results of the preference test are the eight products in the very like category and the two products in the like category with an average of 86.3%. The Balinese bridal accessories from the waste of beverage cans showed that it’s feasible and need to be developed as home economic products for craft commodities.

1. Introduction

Waste, especially from inorganic types, can cause pollution and interfere with health, because it cannot be decomposed by bacteria (decomposers). One of them is canned beverage waste. Solid waste, better known as garbage, its presence at a certain time and place is not desired by the environment because it has no economic value [1]. The waste problem is often said to be a reflection of society [2]. The breakthrough is needed to conduct waste management into goods or products that can be utilized and economical and aesthetic value. It could be done by recycling a waste treatment effort with innovation and creativity into products accessories [3].

The most common waste management method is recycling into goods that are more useful for human life. Some examples include the manufacture of handicrafts for various purposes, such as waste plastic bottles used as wall decorations, coffee wrappers that can be made to craft tote bags or curtains to cover rooms, waste cans can be recycled for calligraphy materials, and others. Cans are often interpreted as storage places or containers made of aluminum metal used to package food, drinks. Canned waste cannot be decomposed naturally or by biological processes, because it composed of inorganic components [4]. Processing of canned beverage waste from aluminum can be used as materials of household furniture, the crafts and fashion accessory. Aluminum is easy to recycle without losing its quality, therefore scrap aluminum has significant value indeed [5].

Among the methods to reduce the waste of beverage cans is by applying as Balinese bridal accessories. This is inspired by the existence of the Outer Javanese Bride course which requires
accessories as a complement to the practicum, considering that buying or renting accessories is not cheap. Conservation-based applications can be carried out by processing canned beverage waste which has a thin thickness, the inside is silver, when observed it looks shiny and if held in sheet form, it is similar to the basic material for making Balinese bridal accessories.

According to Purnawanti [6], accessories are additional jewelry or accessories that also enhance the appearance. Accessories or jewelry designed that combines aesthetics and functional technology style [7]. Fang and Zhou [8] explain that jewelry has become a part of human civilization and it is considered as motivating the soft products. Some types of jewelry are considered as the soft type’s fashionable product [9]. Reasons to recycle of canned beverage waste is the basic material for making Balinese bridal accessories on the grounds that it has a shiny color and is similar to the material for making Balinese accessories which are generally made of aluminum.

Balinese bridal accessories consist of white and yellow *kantil/champaka* flowers, gold *sandan*, hood flowers, *puspa lembo*, clover flowers and *gonger*. Badong, petitis, kana bracelets, dragon bracelets, red roses, *pending* are also included in traditional Balinese accessories [10]. In 2005-2016 there began to be many modifications of hair, face, clothing, and accessories, all of them can be modified according to the wishes of the make-up artist following the development of the times [11].

In line with the current pandemic conditions, there are many layoffs, restrictions on activities that have made many sectors experience drastic changes, both in behavior, consumption methods and health protocols greatly affect human life, resulting in a lot of unemployment and job opportunities that can be done to meet the needs of life. this new normal era. Balinese bridal accessories were previously made of aluminum, but because of the large amount of waste cans that have accumulated, they can be engineered by processing them as unique and interesting accessory innovation products. The objective of this study was to determine the feasibility of Balinese bridal accessories by engineering the processing of canned beverage waste as an innovation product in the new normal era.

2. Methods

The research methods used were experimental. According to Sugiyono [12] experimental research methods can be interpreted as a method used to find the effect of certain treatments on others under controlled conditions. This study uses a pre-experimental design to reveal cause-and-effect. This design can be described as in Table 1.

| Accessories result | Treatment | Accessories result |
|--------------------|-----------|--------------------|
| O₁                 | X         | O₂                 |

Description:

O₁ : Accessories result (before the treatment).

O₂ : Accessories result (after the treatment).

X : The pre-treatment of accessories before being given experimental treatment.

The object of this research was a Balinese bridal accessory product from canned beverage waste. Accessory products consist of ten products, namely *petitis*, *sandan* crown, *kapok* flower, *garuda mungkur*, kompyong, *puspo limbo*, kana bracelet, *nagasastra* bracelet, pending, *badong* necklace which must be tested for feasibility through sensory and preference tests, so that the product can be validly recognized. The subjects of this study were women with a total of 15 people, respondents were obtained from students of the 2015 Beauty Education Study Program assessing the aspect of the preference test. 3 experts (expert judgment), namely 2 bridal makeup and 1 traditional accessories seller who assesses the feasibility of the traditional accessories’ products.

The validity of the research instrument uses the expert judgment method in this case after the instrument and product are constructed and measured based on a certain theory, then experts are consulted. The assessment instrument used in the validity test and accessory feasibility test contains...
several indicators consisting of shape, manufacturing technique, strength and packaging, while the preference test contains indicators of form, manufacturing technique, final result, packaging, attractiveness, and durability. Each indicator has a score range of 1-4 with the highest score of 4 and the lowest score of 1. The product validity was carried out by 2 make-up studios and 1 accessories seller, while the instrument validity was carried out by two lecturers.

The collection of data through observation and documentation. The analysis used a descriptive percentage the formula for descriptive analysis of percentages is given in Equation (1).

\[
\% = \frac{n}{N} \times 100\% 
\]

Information:

\(\%\) : Percentage score
\(n\) : The number of quality scores obtained
\(N\) : Ideal score (highest score x number of panelists)

2.1. Accessories Making

2.1.1. Tools and Materials. The tools and materials used in this study can be described in the Table 2.

**Table 2. Tools and materials**

| No. | Tools and Materials     | Picture | Utility                                                      |
|-----|-------------------------|---------|--------------------------------------------------------------|
| 1   | Canned drink waste      | ![Picture](image1) | As a basic material for making accessories                   |
| 2   | Iron scissors           | ![Picture](image2) | For cutting wire and drink cans                              |
| 3   | Ordinary Scissors       | ![Picture](image3) | For cutting paper and cloth                                  |
| 4   | Paint remover           | ![Picture](image4) | To remove brand paint on cans                                |
| 5   | Stationary              | ![Picture](image5) | To design accessories                                         |
| 6   | Pliers                  | ![Picture](image6) | For cutting, bending and straightening                       |
| 7   | Wire                    | ![Picture](image7) | Wire for stringing, making springs and combining accessories  |
| 8   | Hammer                  | ![Picture](image8) | To assist in making the engraving pattern                    |
No. | Tools and Materials | Picture | Utility
---|---------------------|---------|--------
9. | Iron mold | ![Picture](image1.png) | For engraving pattern print
10. | Brass plate | ![Picture](image2.png) | As stem flower accessories hood
11. | Glue | ![Picture](image3.png) | To paste materials
12. | Soldering iron | ![Picture](image4.png) | For gluing copper
13. | Beads | ![Picture](image5.png) | To decorate accessories
14. | Pilox clear | ![Picture](image6.png) | As a tin polisher

2.1.2. Accessories Design. Some of the results of the finished product is generated using the concept of waste-based beverage cans. Accessories produced meets the elements contained in the Balinese bride decoration. The resulting product and accessory designs can be seen in the Table 3.

### Table 3. Accessories design

| No. | Accessories Name | Accessories Design | Pictures | Result |
|-----|------------------|--------------------|----------|--------|
| 1.  | Petitis (A)      | ![Picture](image7.png) | ![Picture](image8.png) |        |
| 2.  | Sandet crown (B) | ![Picture](image9.png) | ![Picture](image10.png) |        |
| 3.  | Cap flower (C)   | ![Picture](image11.png) | ![Picture](image12.png) |        |
| 4.  | Garuda Mungkur (D) | ![Picture](image13.png) | ![Picture](image14.png) |        |
| 5.  | Kompyong (E)     | ![Picture](image15.png) | ![Picture](image16.png) |        |
| No. | Accessories Name     | Accessories Design | Pictures | Result |
|-----|----------------------|--------------------|----------|--------|
| 6.  | Pupolemb (F)         |                    | ![Pupolemb](image) |        |
| 7.  | Cana Bracelet (G)    | ![Cana Bracelet](image) |        |
| 8.  | Nagasastra Bracelet (H) | ![Nagasastra Bracelet](image) |        |
| 9.  | Pending (I)          | ![Pending](image)   |          |        |
| 10. | Badong Necklace (J)  | ![Badong Necklace](image) |        |

All of the components of the elements contained in the Balinese bridal decoration, they are arranged into a decorative unit. The bridal decoration application uses the concept of recycling canned beverage waste. The resulting accessories have an attractive visual appearance because they are bright and unique without reducing the required values. Figure 1 describes some examples of the resulting display of accessories.

**Figure 1.** Application of Balinese bridal accessories

### 3. Results and Discussions

The results of canned beverage waste processing as an innovative product of Balinese bridal accessories can be accepted by the user community based on the results of the Feasibility test which includes the results of the validity test, sensory test, and preference test. The validity test was carried out to test the validity of Balinese bridal accessory products by expert validators (Indie Wedding Gallery, Arief Bridal Team, and Melody Accessories Shop). Sensory tests were conducted to sensorily assess Balinese bridal accessory products by expert panelists (Rias Iwoel Studio, Puri Niken Rias Studio, and Ibu Soeparno Sanggul Shop). The preference test was conducted to assess the level of preference for Balinese bridal accessory products from canned beverage waste by 15 students of Beauty Education. Based on the results of instrument validation by two validators of lecturers, it was obtained a value of 92.85% and 96.42% so that the instrument to be used is declared valid.
3.1. Product Validity Results

The results of product validity were obtained from the results of the assessment of Bali Bridal accessory products from canned beverage waste which were assessed by three validators, namely validator 1 by Indie Wedding Gallery, validator 2 by Arief Team Bridal Semarang, and validator 3 by Melody Accessories Shop with aspects of assessment based on shape, manufacturing technique, strength, packaging. The results of the product validity test are illustrated in Figure 2.

![Figure 2](image)

**Figure 2.** The result of the percentage of validity test

Based on the assessment made by the product validator, it can be stated that all products accessories in the very valid category with an average value (90.6%). The highest score was obtained by flower cap accessories with a score (95.8%). Canned beverage waste after undergoing a transformation in the form of recycling can become a product that has economic value in this case accessories for Balinese brides. This is in line with what was expressed by Cimatti et al. [13] where recycling can be easily applied to increase sustainability in fashion production. Recycling is a process of collecting and processing materials that should be disposed of as waste and turn them into new products, in the case of fashion, cloth, leather, and other unused components that are stored are waste that can be utilized with this methodology, obtaining new products.

3.2. Product Sensory Test Results

The sensory test assessment was carried out by three experts, namely a make-up studio and an accessory expert. This rating using instruments with criteria: shape, manufacturing technique, strength, packaging. The result of sensory test is given in Figure 3.

![Figure 3](image)

**Figure 3.** The sensory test percentage results

The sensory test assessment of Bali Replacement accessory products made from beverage waste cans concluded that the average product score was (87.5%). Lowest score obtained pending accessories and badong necklaces (79.2%), while the highest score was obtained by accessories earring and crown with a percentage (95.8%). Eight products are included in the "very feasible"
category and the other two products received "decent" category. Based on the results obtained, beverage cans are often regarded as waste can be transformed into a compatible accessory to be used, in this case as decoration accessories bride Bali, which there is related with study of Wu [14] that designers shall consider how to achieve environmental protection, and longer product life cycle. One of the most positive developments in the modern fashion industry is that creative designers take the lead to turn garbage into fashion.

3.3. Preference Test Results
A test of preference for Balinese bridal accessory products from canned beverage waste by 15 moderately trained respondents, obtained an assessment of all products in the "very like" category.

![Figure 4](image.png)

**Figure 4.** The results of the percentage of the preference test

The results of the preference test for Balinese bridal accessory products show the average overall score of the product is (86.3%) with the highest score obtained from the crown of sandat accessories (96.7%), score of the lowest is the right bracelet accessory (79.2%). The accessory that received the most favorable rating was the sandat crown due to its towering and dense shape gives the most interesting impression. The accessory that gets the lowest score is the cana bracelet accessory because of its shape less symmetrical and slightly stiffer material. These results are in accordance with Vankatesh [15] statement that the visual forms of objects are related to texture, harmony and neatness create beauty. The manufacture of accessories from canned beverage waste uses the technique of forming motifs and its application to Balinese brides, while according to Sinaga [1], the manufacture of accessories from aluminum waste uses a smelting technique with 500 degrees heat with application to fashion accessories.

4. Conclusion
Balinese bridal accessories products made from canned beverage waste were declared very feasible based on sensory test results with the indicators of shape, manufacturing technique, strength, and packaging and were declared highly favorable based on preference test results with indicators of shape, manufacturing technique, final results of accessories, packaging, attractiveness, durability. All of this can be realized by engineering, supported by innovation and creativity, which produces appropriate products and provides enormous benefits for craftsmen and accessories users as well as contributing to society in the new normal era.

References
[1] Sinaga N A 2016 E-Proceeding of Art & Design 3 (2) 269-279
[2] Adane A 2018 Intl Journal of Waste Resources 8 1-4
[3] Setyowati E and Sukes S 2018 AIP Conference Proceedings 1941 020034
[4] Ding N, Gao F, Wang Z, Gong X and Nie Z 2012 Proc Engineering 27 465–474
[5] AlSaffar K A and Bdeir L M H 2008 Journal of Engineering and Development 12 (3) 157-163
[6] Purnawanti L 2011 Pintar Membuat Aksesoris Untuk Pemula Bekasi: Laskar Aksara
[7] Seymour S 2008 Fashionable Technology: The Intersection of Design Vienna: Springer
[8] Zhou Y and Fang X 2017 Proceedings of the 2017 International Conference on Sports, Arts, Education and Management Engineering (SAEME 2017) 254-257
[9] Wannarumon S 2011 Naresuan University Engineering Journal 6 (1) 41-56
[10] Wulansari Ni Putu D 2015 E-Jurnal 04 (02)
[11] Putri Fifi A S P 2017 E-Journal 06 (02)
[12] Sugiyono 2016 Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D Bandung: Alfabeta
[13] Cimatti B, Campana G and Carluccio L 2017 Procedia Manufacturing 8 393-400
[14] Wu Q 2019 Conference Proceedings of the 3rd International Virtual Conference on Educational Research and Innovation 303-307
[15] Venkatesh A, Joy A, Sherry Jr. J F and Deschenes J 2010 Journal of Consumer Psychology 20 459-470