

Jewelry Set Design Based on the Adaptation of the Keris Shape

Chairunnisa Rania Humaira¹, Edwin Buyung Syarif², Fajar Sadika³

^{1,2,3}Fakultas Industri Kreatif, Universitas Telkom, Bandung, Indonesia

Email: chairunnisarania@student.telkomuniversity.ac.id, edwinbuyung@telkom.university.ac.id.

fajarsadika@telkomuniversity.ac.id

ABSTRACT

Jewelry is a form of cultural and artistic wealth. Apart from that, jewelry products have also spread to the global market in various major countries, this is evident from data on jewelry exports in Indonesia which have increased by up to 24.21% even in the midst of the Covid-19 pandemic. In modern life, of course, there are many women who want to beautify themselves with jewelry because the main users of this jewelry are women, but the jewelry that we often see has simple geometric shapes, therefore a strategy is needed to implement cultural values into everyday product. One form of culture that we have is the keris. Keris is a kind of dagger that functions as a weapon or spiritual object. In addition, the keris is also popular as a collection item that has high value from an aesthetic point of view because it has interesting artistic elements. The artistic elements contained in the keris can also be implemented into products that we use every day, namely jewelry. This writing aims to design jewelry by taking several parts of the keris which will be adapted into jewelry forms in order to provide innovation in the form of jewelry that has a novelty value without losing the characteristics of the keris.

Keywords: Jewelry, Keris, Art

Introduction

Indonesia has a huge cultural diversity. According to Nurhidayat (2017), Indonesian society is a multicultural society with many tribes. One form of culture that we have in the form of weapons is the keris. UNESCO stipulates that the keris is a type of asymmetrical dagger typical of Indonesia that functions as a weapon or spiritual object. Keris is one of the types of traditional weapons that has developed in Indonesia. This is evident from the Coordinating Ministry for Maritime Affairs and Investment which states that among the many traditional Indonesian weapons, the keris is the most famous or widely known weapon both in terms of philosophy, naming, form, forging, dissemination and even artistic elements. Reporting from culture.pdkjateng.go, the keris was declared a UNESCO Intangible Cultural Heritage in 2005. This statement is evidenced by UNESCO which says that the keris is a type of dagger that originated in Indonesia. The keris is used in two different ways, as a weapon and as a spiritual object, but the kris is believed to have magical powers. The Coordinating Ministry for Maritime Affairs and Investment explained that according to the Javanese people, the keris is known as Tosan Aji or Wesi Aji, which means 'objects of value or glory'. UNESCO also states that the keris has three aesthetic values: Dhapur (there are 40 variations of shapes and blades), Pamor (metal ornamental patterns on the blades reach 120 variations), and Tangguh (related to age and origin). Keris is one of the cultural products. The Ministry of Education and Culture said that the keris contains many noble cultural values of craftsmen and is symbolized by the parts of the keris. Keris are also popular as collectibles that are judged from an aesthetic point of view [1]–[4].

Even though the keris is a traditional weapon, the keris certainly has very interesting artistic elements. The beautiful forms contained in the keris can also be implemented into other forms, namely jewelry. In Indonesia, jewelry sales continue to increase, this is proven based on data from the Embassy of the Republic of Indonesia in Bratislava, Slovak Republic that during 2020, even in the midst of the Covid-19 pandemic, Indonesia's jewelry exports actually showed an increase of up to 24.21%. Jewelry manufacturers in Indonesia have applied industry 4.0 technology to improve productivity and product quality, Indonesian jewelry products have targeted the global market in various major countries. In modern life, of course, there are a lot of women who want to beautify themselves by wearing jewelry. [5]–[8] jewelry is an item that supports a person's appearance and social status in society, as well as coloring a lifestyle. [9]–[11] also states that one of the forms of our cultural and artistic wealth is jewelry whose main users are women. One form of jewelry trend is *two-tone jewelry*. Reporting from *weddingphotographyselect.co.uk* jewelry used to be made of only one metal, but thanks to new jewelry techniques and trends, *two tone jewelry* is now a staple material, jewelry makers use a combination of two different metals to give a contrasting look to certain parts. However, the jewelry that we often see has a very simple shape. Almarshus (2019) also stated that many jewelry designs feature simple geometric shapes, this is reinforced by Monika (2020) who stated that currently, Indonesian people feel more comfortable and confident when wearing jewelry that does not reflect Indonesian culture. So it is not surprising that the characteristics of jewelry with ancient Indonesian culture are increasingly unpopular and almost extinct.

Therefore, a strategy is needed to integrate cultural values into products used in daily life, as well as increase people's interest in buying local products that are not inferior to foreign products. According to Sadika (2017), product design development is a design activity that produces innovation and is implemented based on changes that are limited to certain specifications. Of course, with the adaptation of the keris into the form of jewelry, we will provide an innovation from the forms of jewelry that already exist in Indonesia and will also not forget one of the cultural riches of our archipelago, namely the keris [12]–[15].

Based on the phenomenon that has been explained, it can be explained that the keris is a traditional weapon that has interesting philosophical and aesthetic values. The keris is also the most famous traditional weapon and is a venerable object. In addition to being a traditional weapon, the keris also has a use as a complementary tool for traditional ceremonies, determinants of social status, and collectibles. In addition to the keris that are known to have very interesting visual elements and aesthetic elements, the keris must also be produced with beautiful intentions [16]–[20].

This design will focus on processing the shape of the keris by implementing it into other forms, namely jewelry products that have the value of novelty or innovation. This jewelry set will be designed without eliminating the characteristics of the keris, in order to introduce elements of the art of keris by utilizing jewelry as a medium so that our love for the keris which is one of the most valuable cultures of the archipelago continues [21]–[24].

Research Methods

In this design, the event used is the form of jewelry circulating in Indonesia has a simple shape and is mostly inspired by western culture. Therefore, this study uses a qualitative method to design jewelry products that combine traditional and modern concepts by adapting keris ornaments so that the designed jewelry has a novelty value. The data collection procedure is in the form of observation data and questionnaires to obtain the necessary information and characteristics. Based on the statement of Kusumastuti and Khoiron (2019:12) that qualitative research uses inductive data processing techniques. This inductive analysis is used for several reasons. First, the inductive process is more able to find many facts in the data. Second, inductive data analysis can make the researcher-respondent relationship identifiable and explainable. Third, such an analysis can describe the configuration more completely. Fourth, inductive analysis can find general influences that strengthen relationships. Fifth, such an analysis can explicitly consider value as part of an analytical structure [25]–[28].

In this design, there are considerations that must be met so that the product is in accordance with user needs, including; Jewelry designs that are suitable for users who will wear them for formal and informal activities, and use two colors or two tones with white gold and rose gold colors. The data collection used in this design process is a literature study, a form study, and an observation study. The approach used in the design this time is the theory of visual, material, and function. The data analysis used in the design this time is SCAMPER. Among the list of questions contained in the SCAMPER method, three questions were obtained that will be used for this design, including Adapt; focusing on adapting the shape of the keris into the form of jewelry. Modify/Magnify; The shape that has been obtained from the data will then be modified by stylization [29]–[31].

Results and Discussion

Mindmap

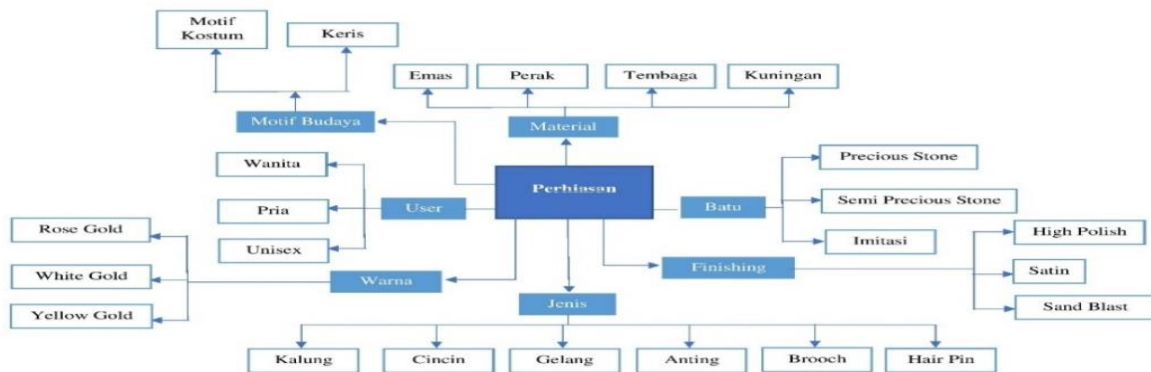


Figure 1. Mindmap





















Moodboard

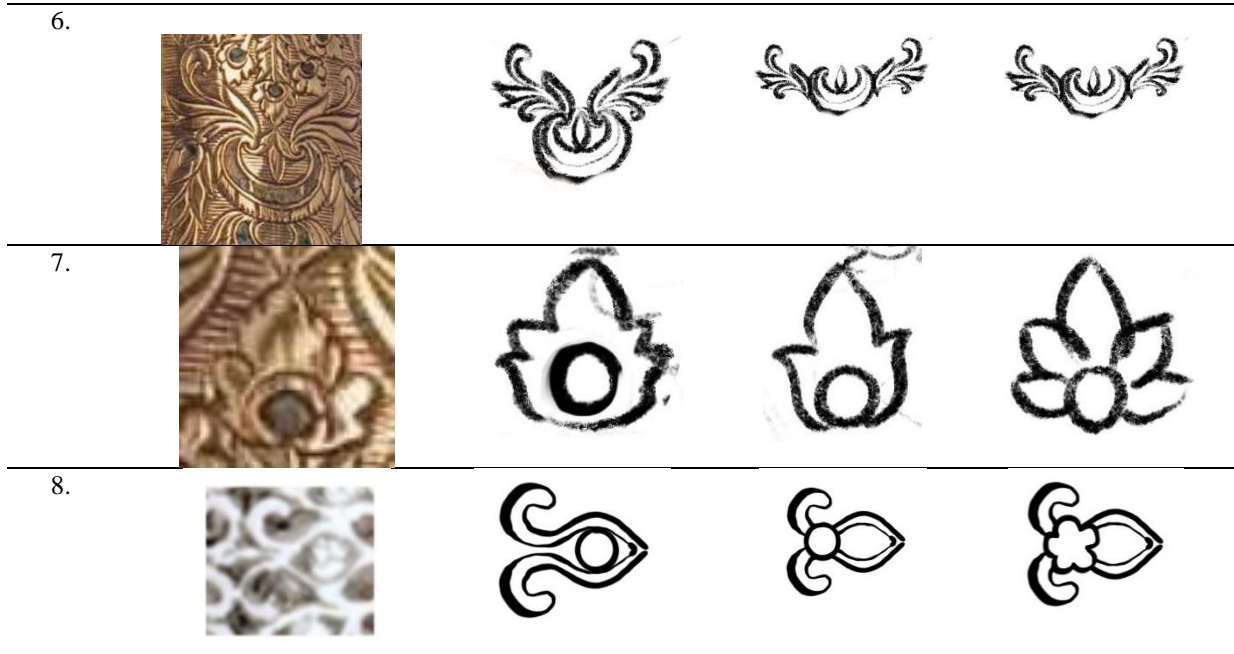


Figure 2. Moodboard
Source: Author Data

Stylization Data

Table 1. Stylization Data

It	Basic Form	Stylization 1	Stylization 2	Final stylization
1.				
2.				
3.				
4.				
5.				



Source: Author Data

Alternative Sketching

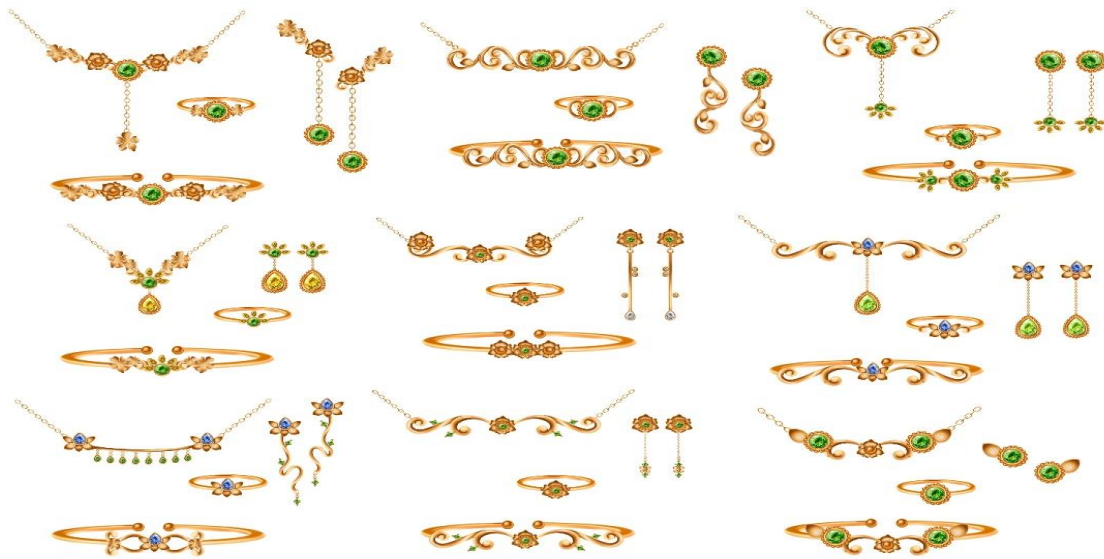


Figure 3. Alternative Sketching

Source: Author Data

Final Sketch



Figure 4. Final Sketch
Source: Author Data

3D Modeling



Figure 5. Necklace Visualization
Source: Author Data



Figure 6. Necklace Visualization
Source: Author Data

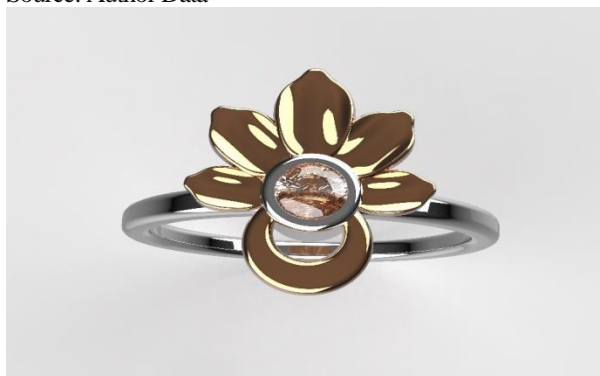


Figure 7. Ring Visualization
Source: Author Data

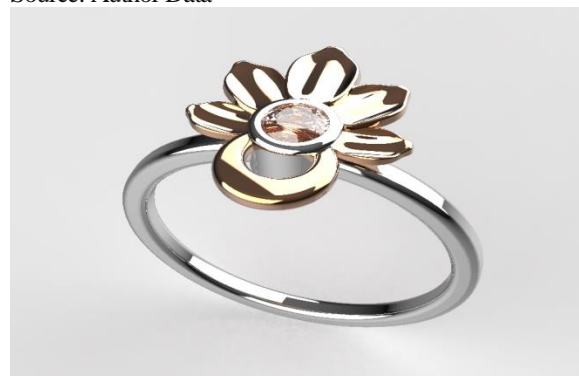


Figure 8. Ring Visualization
Source: Author Data



Figure 8. Wristband Visualization
Source: Author Data



Figure 9. Wristband Visualization
Source: Author Data

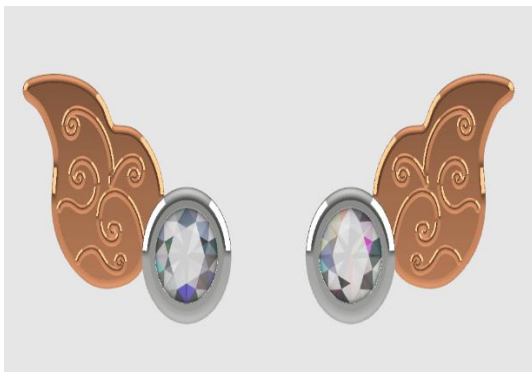


Figure 10. Earrings Visualization
Source: Author Data

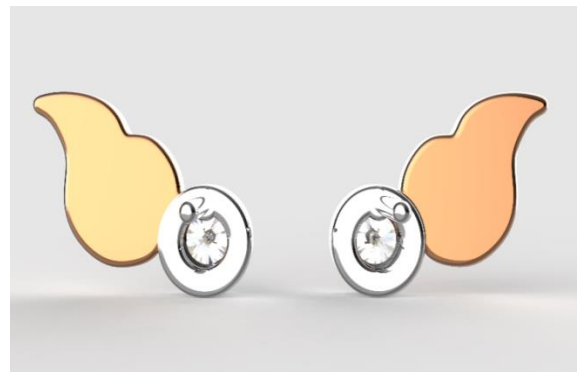


Figure 11. Earrings Visualization
Source: Author Data

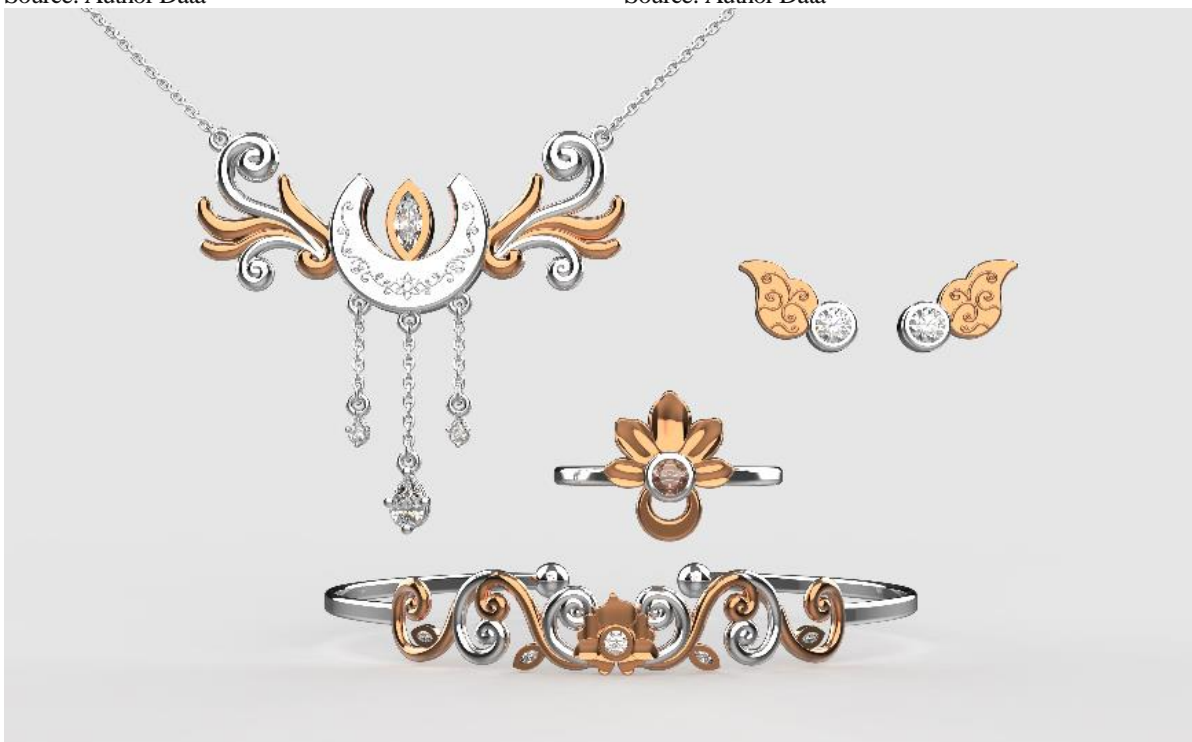


Figure 12. Visualization of a set of jewelry
Source: Author Data

Technical Drawings

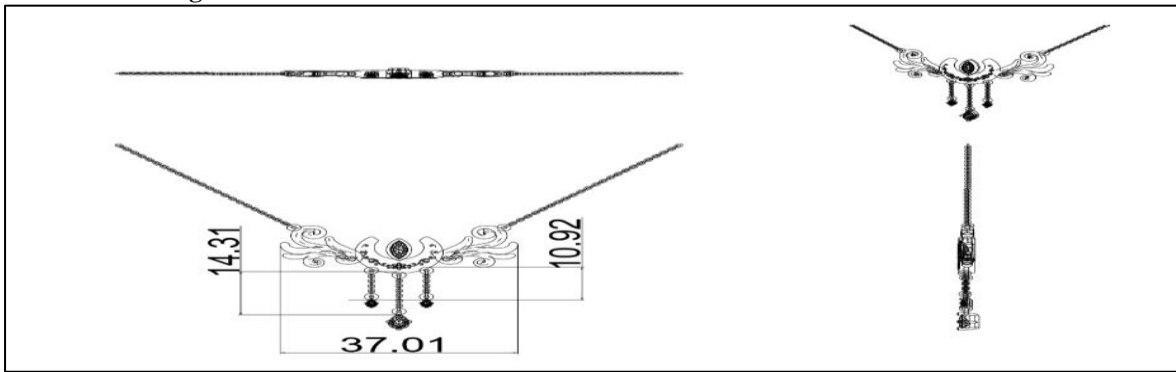


Figure 13. Necklace Engineering Drawings

Source: Author Data

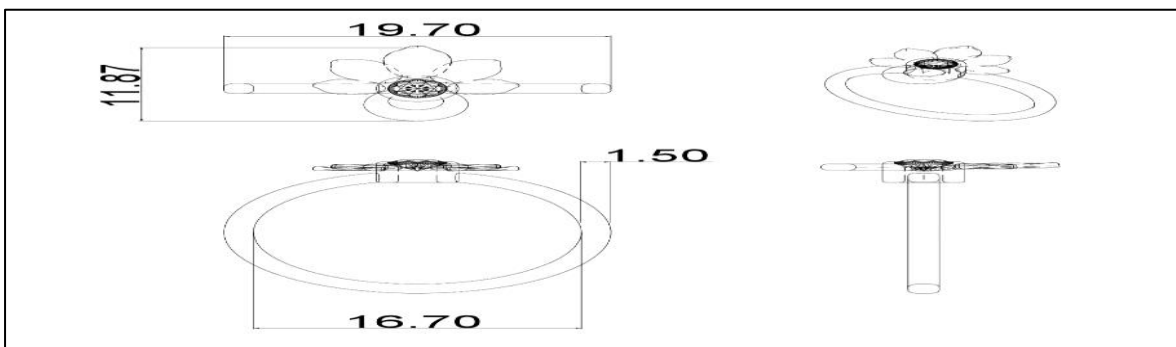


Figure 14. Ring Engineering Drawing

Source: Author Data

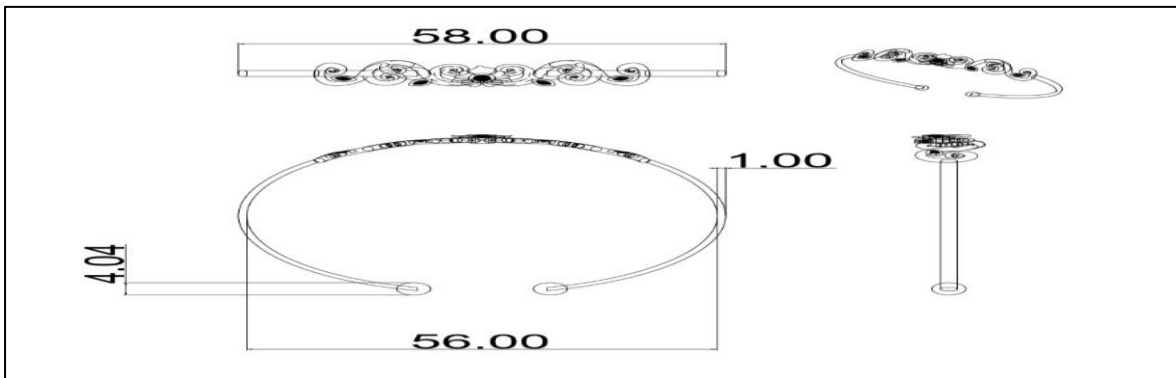


Figure 15. Bracelet Technique Drawing

Source: Author Data

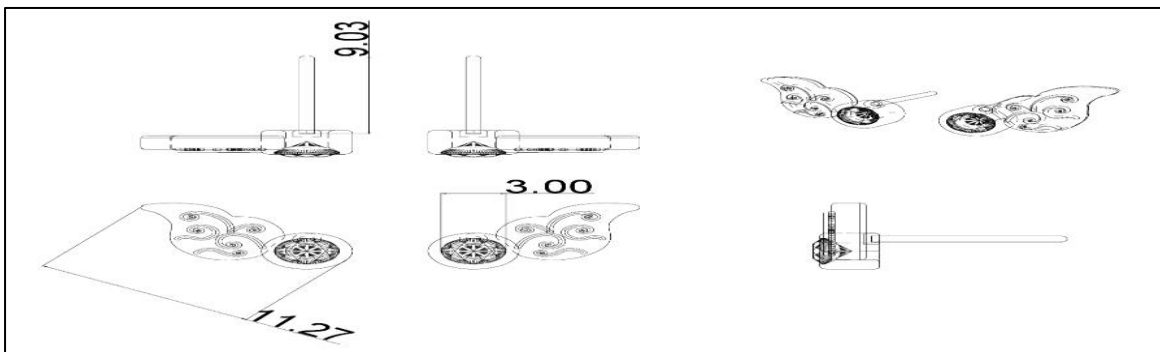


Figure 16. Earrings Visualization

Source: Author Data

Production

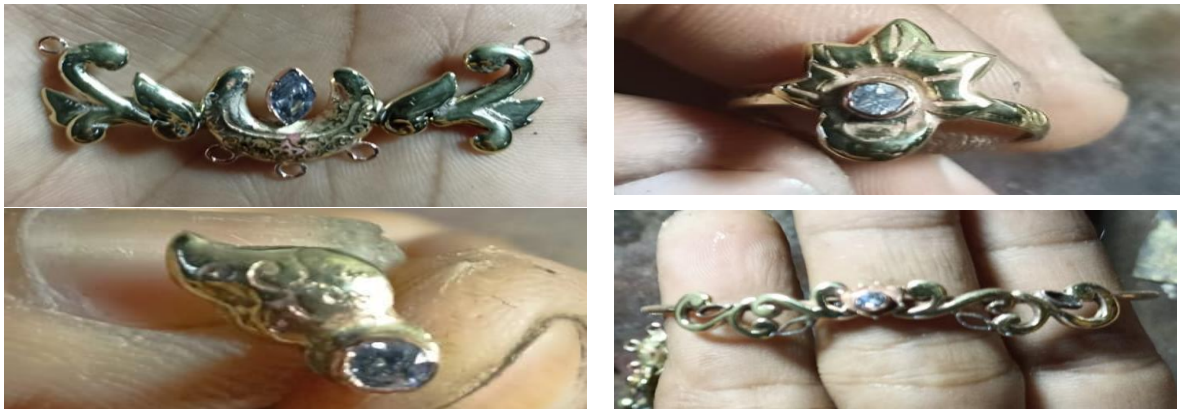


Figure 17. Pre-Finishing Jewelry Production

Source: Author Data

Product Finishing

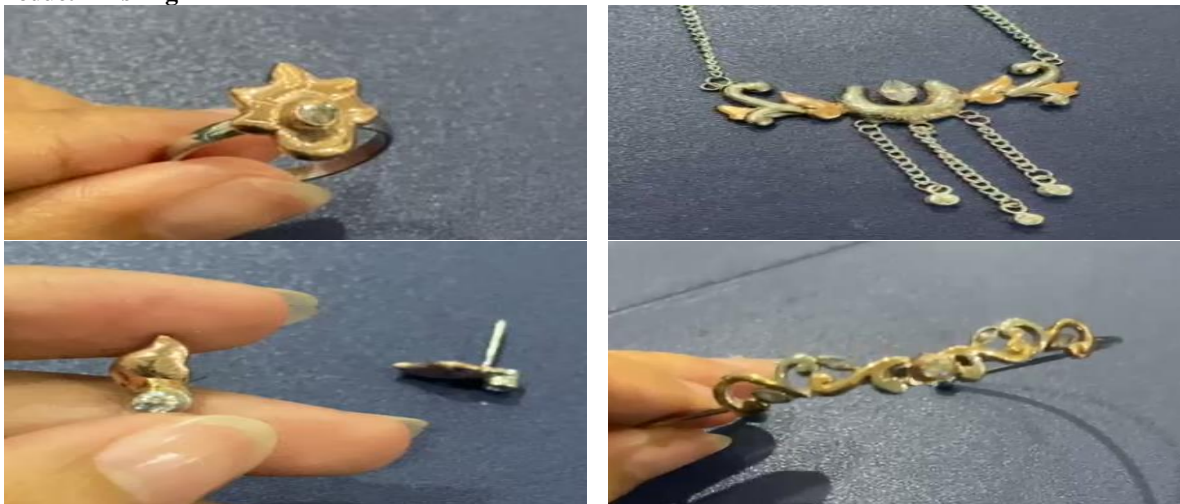


Figure 18. Jewelry Production After Finishing

Source: Author Data

Final Product

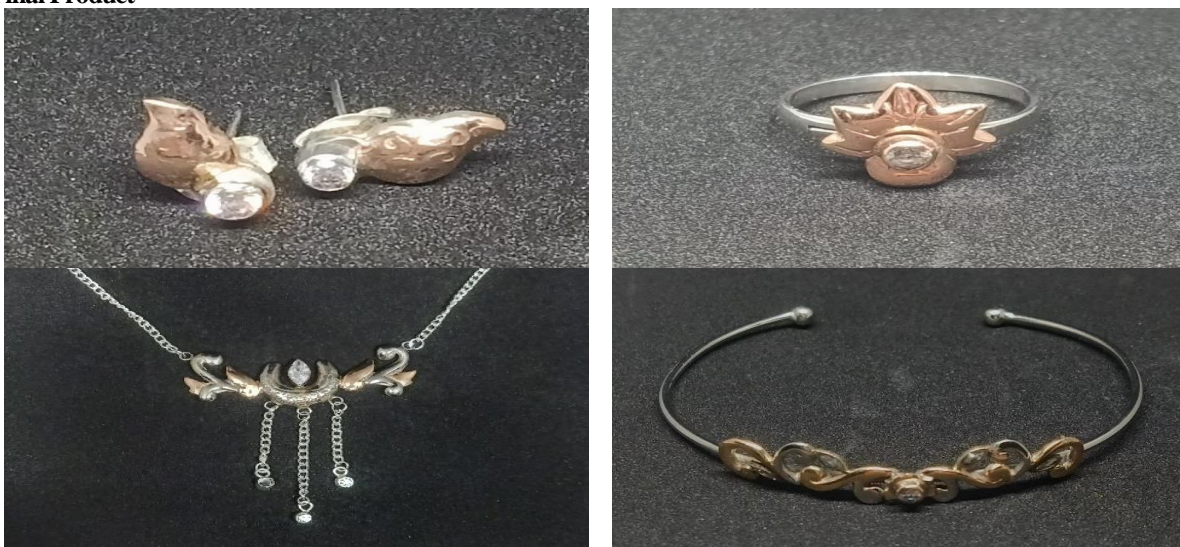


Figure 19. Final Product

Source: Author Data

Operational Products



Figure 20. Operational Product Photos
Source: Author Data












Figure 21. Operational Product Photos
Source: Author Data

Approach Theory

Visual

In the design process, stylization is carried out from the forms that have been obtained from the data, namely;

Table 2. Selected Stylization Forms

No.	Original Image	Stylized Images	3D Modeling
1.			
2.			
3.			

4.



Source: Author Data

Material

The material used in this design is brass because it will make the price of the designed jewelry more affordable. Then the copper material is plated with white gold and rose gold colors according to user needs.

Function

This design focuses on maximizing the function of jewelry, including;

1. A necklace is a piece of jewelry worn around the neck
2. A bracelet is a piece of jewelry worn on the wrist area
3. A ring is a piece of jewelry worn on the finger of the hand
4. Earrings are jewelry worn around the earlobe

Validation Results

After the jewelry set is completed, then a validation process will be carried out by piloting the product. From the validation process that has been carried out, the following results have been obtained, including;

Table 3. Selected Stylization Forms

No.	Name	Opinion	Is it appropriate	Excess	Deficiency
1.	Nadya Salsabila	Good, the design is simple and looks luxurious	Appropriate	Comfortable to wear and does not make itching	Less prominent colors
2.	Farah Agnia	Elegant design and fit	It is appropriate	Comfortable to use, the shape is just right, elegant, and supports the appearance	Lack of small gems makes much better
3.	Clarissa	The design is good	To my liking	Simple. But it will look beautiful when worn with a dress	The color is less shiny
4.	Resti Yuliani	Interesting and displays the old impression	Appropriate	Interesting, it can support the appearance because the style is unique and comfortable to wear	Risk of falling easily because it does not fit the size of the finger
5.	Ika Syaila	It is varied and good to see	Suitable especially for the earrings	The material is okay, the color is minimalist	Not <i>adjustable</i>

Source: Author Data

Conclusion

Based on the results of the design that has been carried out, it can be concluded that the design of the product, which is in the form of a jewelry set, has been successfully produced with copper material and uses *white gold* and *rose gold* plating. Product design succeeds by maximizing the use of visual, material, and functional theories.

Reference

- [1] C. Wang, "Strength design of porous materials using B-spline based level set method," *Comput. Methods Appl. Mech. Eng.*, vol. 418, 2024, doi: 10.1016/j.cma.2023.116490.
- [2] L. Hu, "Optimal Weighting Factor Design of Finite Control Set Model Predictive Control Based on Multiobjective Ant Colony Optimization," *IEEE Trans. Ind. Electron.*, vol. 71, no. 7, pp. 6918–6928, 2024, doi: 10.1109/TIE.2023.3301534.
- [3] Z. Chen, "An Elderly-Oriented Design of HMI in Autonomous Driving Cars Based on Rough Set Theory and Backpropagation Neural Network," *IEEE Access*, vol. 12, pp. 26800–26818, 2024, doi: 10.1109/ACCESS.2024.3366548.
- [4] Z. Huang, "Preference-based multi-attribute decision-making method with spherical-Z fuzzy sets for green product design," *Eng. Appl. Artif. Intell.*, vol. 126, 2023, doi: 10.1016/j.engappai.2023.106767.
- [5] S. J. van den Boom, "A level set-based interface-enriched topology optimization for the design of phononic crystals with smooth boundaries," *Comput. Methods Appl. Mech. Eng.*, vol. 408, 2023, doi: 10.1016/j.cma.2023.115888.
- [6] H. Li, "Joint Radar and Communications Waveform Design Based on Complementary Sequence Sets," *Remote Sens.*, vol. 15, no. 3, 2023, doi: 10.3390/rs15030645.
- [7] N. J. Shallcross, "Informing Program Management Decisions Using Quantitative Set-Based Design," *IEEE Trans. Eng. Manag.*, vol. 70, no. 9, pp. 3213–3228, 2023, doi: 10.1109/TEM.2021.3078387.
- [8] R. Li, "An integrated group decision-making method for brand packaging design effect evaluation based on the 2-tuple linguistic Pythagorean fuzzy sets," *J. Intell. Fuzzy Syst.*, vol. 45, no. 2, pp. 2167–2177, 2023, doi: 10.3233/JIFS-232054.
- [9] M. Nakagawa, "Level set-based multiscale topology optimization for a thermal cloak design problem using the homogenization method," *Int. J. Heat Mass Transf.*, vol. 207, 2023, doi: 10.1016/j.ijheatmasstransfer.2023.123964.
- [10] P. Zhang, "Optimal Design of Electrode Topology of Dielectric Elastomer Actuators Based on the Parameterized Level Set Method," *Soft Robot.*, vol. 10, no. 1, pp. 106–118, 2023, doi: 10.1089/soro.2021.0169.
- [11] Y. Luo, "A design model of FBS based on interval-valued Pythagorean fuzzy sets," *Adv. Eng. Informatics*, vol. 56, 2023, doi: 10.1016/j.aei.2023.101957.
- [12] L. Zhang, "Level set-based topological design of multiphase micro-architected materials using alternating active-phase method," *Mater. Des.*, vol. 225, 2023, doi: 10.1016/j.matdes.2022.111448.
- [13] Z. Qiang, "Multi-stage design space reduction technology based on SOM and rough sets, and its application to hull form optimization," *Expert Syst. Appl.*, vol. 213, 2023, doi: 10.1016/j.eswa.2022.119229.
- [14] Z. Feng, "Fuzzy-based asynchronous controller design on reachable set synthesis of nonlinear hidden Markovian jump systems," *Chaos, Solitons and Fractals*, vol. 170, 2023, doi: 10.1016/j.chaos.2023.113340.
- [15] Q. Ma, "A novel MCDM approach for design concept evaluation based on interval-valued picture fuzzy sets," *PLoS One*, vol. 18, no. 11, 2023, doi: 10.1371/journal.pone.0294596.
- [16] W. Li, "A novel design of multi-user sequence set for joint vehicular radar-communication based on Oppermann family," *Digit. Signal Process. A Rev. J.*, vol. 141, 2023, doi: 10.1016/j.dsp.2023.104119.
- [17] Z. Sheng, "Concurrent topology optimization of multiple components sharing partial design domain based on distance regularized parameterized level set method," *Int. J. Numer. Methods Eng.*, vol. 124, no. 15, pp. 3352–3386, 2023, doi: 10.1002/nme.7250.
- [18] B. Hu, "Propeller design rule extraction based on rough set theory," *Hangkong Dongli Xuebao/Journal Aerosp. Power*, vol. 38, no. 8, pp. 1901–1908, 2023, doi: 10.13224/j.cnki.jasp.20210645.
- [19] W. Chen, "A novel group decision making model based on Interval neutrosophic sets for product modeling design quality evaluation," *J. Intell. Fuzzy Syst.*, vol. 45, no. 6, pp. 9771–9783, 2023, doi: 10.3233/JIFS-233825.
- [20] M. Ström, "A set-based-inspired design process supported by axiomatic design and interactive evolutionary algorithms," *Int. J. Prod. Dev.*, vol. 27, no. 3, pp. 186–212, 2023, doi: 10.1504/IJPD.2023.133054.
- [21] J. Hao, "A Decision-Making Method for Design Schemes Based on Intuitionistic Fuzzy Sets and Prospect Theory," *Symmetry (Basel)*, vol. 15, no. 8, 2023, doi: 10.3390/sym15081570.
- [22] G. Işık, "Design of acceptance sampling plans based on interval valued neutrosophic sets," *Soft Comput.*, vol. 27, no. 20, pp. 14601–14619, 2023, doi: 10.1007/s00500-023-09027-6.
- [23] T. Driesen-Micklitz, "A Set of Design Principles for Personalized Information in Automated Driving User

- Interfaces Based on Theory and Empirical Evidence,” *IEEE Intelligent Vehicles Symposium, Proceedings*, vol. 2023. 2023. doi: 10.1109/IV55152.2023.10186755.
- [24] G. T. Gustafson, “To design, or not to design? Comparison of beetle ultraconserved element probe set utility based on phylogenetic distance, breadth, and method of probe design,” *Insect Syst. Divers.*, vol. 7, no. 4, 2023, doi: 10.1093/isd/ixad014.
- [25] C. Bhojar, “Design of an efficient IoT based irrigation platform via fuzzy bioinspired multisensory analysis of on-field parameter sets,” *Transdiscipl. J. Eng. Sci.*, vol. 14, p. 107, 2023, doi: 10.22545/2022/00225.
- [26] D. Liu, “The design of multi-wavelength confocal diffractive optical element based on set operation,” *Optik (Stuttg.)*, vol. 277, 2023, doi: 10.1016/j.ijleo.2023.170667.
- [27] H. Li, “Optimum design and thermal modeling for 2D and 3D natural convection problems incorporating level set-based topology optimization with body-fitted mesh,” *Int. J. Numer. Methods Eng.*, vol. 123, no. 9, pp. 1954–1990, 2022, doi: 10.1002/nme.6923.
- [28] Y. Noguchi, “Level set-based topology optimization for the design of labyrinthine acoustic metamaterials,” *Mater. Des.*, vol. 219, 2022, doi: 10.1016/j.matdes.2022.110832.
- [29] A. L. Kaplan, “Structure-Based Design of a Chemical Probe Set for the 5-HT_{5A} Serotonin Receptor,” *J. Med. Chem.*, vol. 65, no. 5, pp. 4201–4217, 2022, doi: 10.1021/acs.jmedchem.1c02031.
- [30] H. Jiang, “Anti-frost heave design method for a parabolic canal based on the hydraulic optimal solution set in seasonally frozen regions,” *Cold Reg. Sci. Technol.*, vol. 193, 2022, doi: 10.1016/j.coldregions.2021.103433.
- [31] H. Emmendoerfer, “A level set-based optimized design of multi-material compliant mechanisms considering stress constraints,” *Comput. Methods Appl. Mech. Eng.*, vol. 391, 2022, doi: 10.1016/j.cma.2021.114556.