

Waste-based Engineering Technology: The Manipulation of Rags 3-Dimensional Embroidery

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Abstract—The article aims to: 1) defines the process of rags-based 3D embroidery manipulation; 2) describe the manipulation product. This is a research and development on artm consist of exploration, designing, and engineering. Data collected by observation, analyzed by descriptive method. Result state that:

1) The manipulation process consist of exploration, designing and realization of real product; 2) The clutch bag with eyelid manipulation got the best quality. The bag with carnation-form manipulation became the second, the pillowcases with inserted manipulation to be the third, and then the tablecloth with circular manipulation, and the khimar with layered manipulation. The product assessed by several criteria: design elements and principles, comfort, beauty, ergonomics, and security

Keywords—Waste-based; engineering technology; 3-D Embroidery; rags

I. INTRODUCTION

Sustainable Fashion associated with eco-friendly fashion, Eco Fashion or Green Fashion is a part of the growing design philosophy and trend of sustainability. Its goal is to create a system which can be supported indefinitely in terms of environmentalism and social responsibility [1]. Sustainable Fashion is actually a broad subject, with branches that have relationships with other fashion concepts, such as Ethical Fashion which is an ethical approach between fashion design with product consumption and clothing production that maximizes benefits for others and communities, while Minimize adverse impacts on the environment. Eco-Fashion products can use old clothing materials that are recycled or even use other recycle materials [2] such as in textile recycling that offers the following environmental benefits: decrease landfill space requirements, bearing in mind that synthetic fiber products do not decompose and that natural fibers may release greenhouse gasses; avoided use of virgin fibers; reduced consumption of energy and water; pollution avoidance; and Lessened demand for dyes [3]. Up cycling, in contrast, aims to keep the product's quality high and it can even mean increasing the value of the material e.g. through design [4].

Some recycle materials are found in everyday life, i.e. is rags or shred. Rags is a waste piece of cloth [5]. Piece of fabric from the rest of the clothing manufacture, usually in the form of small pieces of cloth discarded by the owner because it is considered as garbage. Utilization of patchwork in fashion products, done by applying various techniques, one of them embroidery.

Embroidery is the art or of applying decoration on fabric or other materials with needle and thread or yarn. In this way, as a means of embellishing clothing and other articles is a very ancient craft [6][7][1]. With the development of technology, the work of embroidery is increased by using tools in the form of embroidery machines, so the work becomes better and faster. Even now has grown computer embroidery. In line with the above opinion, hand embroidery is equated with machine embroidery, and is defined as work that is decorate cloth or leather by using needles and threads, fibers, or leather lines in accordance with Media available [8]

Embroidery applications can be applied in various forms, one of which is the shape of flowers [6]. The patchwork has become one of the trend as a clothing decoration and it changes from the type, the form/design, the textile and also the techniques it self [9]. Variations of embroidery techniques will produce a more varied ornament with an embossed motif or 3 dimensions that resemble the original. There are 10 types of embroidery techniques in 3-dimensional embroidery applications, namely: 1) embossed fibers, 2) velvet fibers, 3) spiral fibers, 4) fibers, 5) ply, 6) dakron, 7) crackers, 8) applications, 9) bundles, and 10) fabric fibers [10].

Three dimensional embroidery in this research use rags as a material that can be applied or added and pasted with the help of the embroidery on the main material. Engineering in this case is combining rags-patchwork in the form of embroidery design and technique. Rags in embroidery 3-dimensional applications can be formed into various forms such as flowers, animals, plants, and so forth. Embroidery 3-dimensional waste-based application as a manifestation of sustainable fashion provides many benefits: 1) utilizing textile waste into useful products, beautiful, and attractive, 2) reducing waste piles that pollute the environment, 3) stimulate

creativity, 4) give Fashion entrepreneur opportunities. Strong reason to raise the theme of 3-dimensional embroidery based patchwork fabric in this study because the market is embroidered 2-dimensional application in the form of cloth and or patchwork with embroidery.

II. METHOD

This is a research and development of artwork that refers to the method of creation, based on the established stage of creation [3], and consist of three stages or six steps namely Exploration, Design, and Materialization.

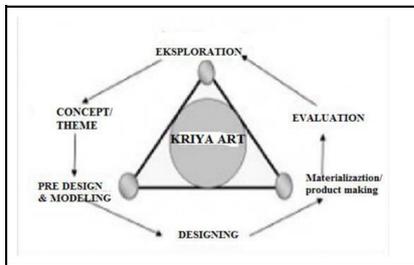


Fig. 1. The method of creation in artwork research and development.

This research refers to 6 steps of creation process of artwork, as follows: 1. Field observation, excavation of reference and information sources, useful for finding themes or issues that require solving; 2. Excavation of theoretical basis, sources and references and visual references, to obtain material data, tools, techniques, constructions, shapes, and aesthetic elements and socio-cultural functions as well as the estimated problem solving selected; 3. Make Design to pour ideas or ideas. Things to be considered in this stage are aspects of material, technique, process, method, construction, ergonomic, security, comfort, harmony, balance, aesthetic element, philosophy, message of meaning, economic value and market share; 4. Make Prototype as realization of designs; 5. Realization of real product realization based on design and Prototype; 6. Evaluate the results of the materialization/product making, through exhibition/community response to criticize the quality of the product.

Data collected by observation with 25 (twenty five) expert and semi-expert observers. The assessment standard based on six criteria: design elements, design principles, comfort, beauty, ergonomics, and security, and four levels: very good (4), good (3), sufficient (2), and poor (1). Data Analyzed by descriptive analysis

III. RESULTS AND DISCUSSION

Process of rags based 3D embroidery manipulation consist of stages: 1. Exploration, including find the problem about textile waste, excavation of reference and information sources about various techniques of textile waste utilization, tools constructions, shapes, and aesthetic elements and socio-cultural functions for solving the problem. 2. Designing, including pre-design of rags based 3D embroidery manipulation product. The designs were 1) form of carnation,

2) eyelid, 3) layered, 4) circular, and 5) inserted. Prototype was made with considering its material, technique, process, method, construction, ergonomic, security, comfort, harmony, balance, aesthetic element. 3. Realization of real product based on the design and prototype: bag, clutch bag, khimar, tablecloth, and pillowcases. Evaluate the product quality through observation that done by 25 observers. The result shown in table 1.

TABLE I. THE QUALITY OF RAGS 3D EMBROIDERY MANIPULATION

Product	4 ^{*)}	3 ^{*)}	2 ^{*)}	1 ^{*)}
1 st product	50.91	36.36	12.48	0.3
2 nd product	61.21	30	8.79	0
3 rd product	30	48.28	19.7	2.12
4 th product	42.73	40.47	16.9	0
5 th product	36.11	50	13.83	0.6

^{*)} the category: 4 very good; 3 good; 2 low; 1 poor

The 1st product is bag with carnation-form manipulation, the 2nd is clutch bag with eyelid manipulation, the 3rd is khimar with layered manipulation, the 4th is tablecloth with circular manipulation, and the 5th is pillowcases with inserted manipulation. Illustratively shown in figure 2.

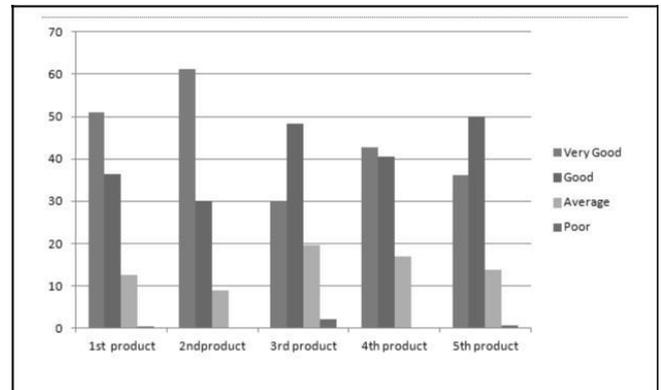


Fig. 2. The quality of rags 3D embroidery manipulation

Based on result above, products are considered eligible, if included in the category very good and good. Based on the observer value, therefore the clutch bag with eyelid manipulation as the second product got the best quality (91.21%), followed by the 1st 87.27% the 5th (86.11), the 4th (83.20) and the 3rd product (78.28).

IV. CONCLUSION

The technique of 3D embroidery manipulation proved able to turn rags function into a beautiful and useful product. The processes used in this study include exploration, designing and realization. The clutch bag with eyelid manipulation got the best quality followed by the 1st, the 5th, the 4th, and the 3rd product. Based on this study, it is possible to make new creations with other techniques, so that it can

transform textile waste into products that are more useful and beautiful.

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REFERENCES

- [1] H. Suhersono. "Desain bordir motif flora dan dekoratif", Jakarta: Gramedia Pustaka Utama, 2004.
- [2] I Karina. "Melihat Eco Fashion sebagai seni merawat bumi", March 2015, retrieved from <http://www.greenpeace.org/seasia/id/blog/melihat-eco-fashion-sebagai-seni-merawat-bumi/blog/52396/>.
- [3] R. LeBlanc. "The Basics of Textile Recycling". March 01, 2017 . retieved from <https://www.thebalance.com/the-basics-of-recycling-clothing-and-other-textiles-2877780>.
- [4] K. Niinimäki. "Sustainable fashion: new approaches". Helsinki: Aalto University Publication, 2013.
- [5] Meriam-Webster Dictionary. Retrieved from <https://www.merriam-webster.com/dictionary/rag>
- [6] Aranea. "A brief history of embroidery". Retrieved from: <http://www.ecs-imperial.org/library/essays/A%20Brief%20History%20of%20Embroidery.pdf>
- [7] J. Morris. "History of embroidery". Retrieved from <http://www.fibre2fashion.com/industry-article/4135/history-of-embroidery?page=1>
- [8] E.K. Syahrul. "Seni bordir pedoman praktis untuk pemula", Bandung: Humaniora Press Bandung, 2010.
- [9] M. Karmila. "Modul kriya tekstil". Bandung: UPI, 2010, (unpublished).
- [10] H. Hasyim. "Bordir aplikasi". Surabaya: Tiara Aksa, 2009.
- [11] Chodijah and WA. Mamdi. "Disain busana". Jakarta: CV Petra, 1982.
- [12] Sp. Gustami. "Proses penciptaan seni kriya: untaian metodologis". Yogyakarta: PPs Penciptaan dan Pengkajian Seni ISI, 2004.
- [13] A. Sudrajad. "Seni kriya", Bandung: Rosdakarya, 2012
- [14] World Heritage Encyclopedia. Sustainable fashion. Retrieved from http://www.ebooklibrary.org/articles/sustainable_fashion
- [15] Y.B. Wantoro. "Membaca pertanda zaman (eksploitasi alam oleh manusia: sebuah interpretasi dalam karya seni patung). Journal of Urban Society's Art. Vol. 12, April 2012. pp. 45-53.