Re-inventing Traditions: Development of Lurik Weaving Motive Designs with Coloured Weft Threads in Indonesia

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Abstract

Lurik woven cloth is a traditional Indonesian textile. Its very existence is the primary potential for the national clothing in Indonesia. The word 'lurik' is derived from the type of motif generated by weft and warp threads, producing classic vertical or horizontal stripes. The growing lurik industry today produces an extensive variety of threads for specific uses, including polyester threads for fabrics and knitted products and nylon threads for the manufacture of accessories.

The objective of the experiment reported here is to develop a pattern design for the traditional lurik woven fabrics using an innovative strategy of graded color warp threads and various color weft threads to reach a wider target audience. The weft used in weaving is made of synthetic threads. Its weaving originality arises from the composition of bright and contrasting colors to create an active visual impact full of energy and passion.

The lurik woven motifs produced through this experiment have been chosen as a clothing product and has received positive feedback from the consumers. In fact, fashion designers are among those who use lurik woven fabric with colorful weft threads as the main material for their designs. This paper shows that the international market demand is expanding and is steadily improving for the products of lurik weaving.

Keywords: Lurik motifs, Woven fabrics, Striated weaving, Coloured weft Threads, Design development,

Introduction

Tenun, or *menenun* (weaving) is the process of producing cloth by crossing or plaiting two sets of perpendicular threads to make woven threads with a certain pattern. Another definition of *tenun* or weaving is the process of connecting warp and weft threads to make textiles. The thread group consists of a group of threads that make up the fabric length (warp threads) and a group of threads that make up the fabric width (weft threads) (Setiadi, et al., 2020). Weave is cloth, and weaving is the process of manufacturing cloth. Fabric is a woven sheet commonly used for clothing or household needs. It is also known as textile in modern terminology. A traditional weave is a cloth passed down from generation to generation as a

tradition or custom of an ethnic group. The cloth is handcrafted using a number of woods, mechanical, and human-powered instruments known as Non-Machine Weaving tools (*Alat Tenun Bukan Mesin* - ATBM) (Achmadi, 2011;Purwoko, 2017).

The word 'traditional' refers to culture or habits defined as knowledge owned and used by a group of people who have inherited it and even continues to evolve over time in terms of material quality, color visual appeal, patterns, and motifs. Until recently, traditional woven fabrics have grown in popularity, owing in part to the extensive use of traditional weaving in traditional ceremonies (Triyanto et al., 2017). The traditional weaving industry is defined by the instruments used, the primary raw materials used in manufacturing which is fabric, the production process, and the products created (Mulyanto, et al., 2022).

Furthermore, the scope boundaries are applied in determining, explaining and offering guidance on traditional weaving enterprises so that they can be clearly distinguished from non-traditional weaving businesses that rely on machine tools. Traditional weaving is an intellectual venture of a shared group which is guarded and maintained from generation to generation. Consequently, every community group holds collective and communal traditional knowledge that will continue to be preserved for as long as possible (Ismadi, et al, 2020).

Each region has its own expression for the process of hand weaving traditional woven cloth, which is known as *gendong* (as if the tool was 'carried'). This tool is identifiable by the presence of an '*epor*,' which serves as a form of backrest when weaving and is positioned behind the weaver's waist, giving the impression that the tool is being held by the weaver. When weaving, the weaver presses the weft using a tool called a 'liro,' which is a tool for tightening the weft manipulated by hand, making the sound of 'dong' or 'dog' (Javanese), which is why this loom is sometimes referred to as '*gedog*.'

The '*gedog*' loom has evolved into a '*tejak*' loom, which has had more frames than the '*gedog*' (Java, 2020). When using this tool, the frame acts as a support. Weavers in a seated position move their hands and feet in synchrony. The '*tejak*' loom, which has evolved into a non-machine loom (ATBM), has been passed down from the Netherlands and distributed by Textile Inrichting Bandung (Bandung Textile Technology College).

This traditional loom is called by numerous names across various regions. In Java, it is known as the '*gendong*' or '*gedog*' loom, while in Sulawesi, it is known as the *walidah* loom. Traditional looms are labor-intensive, which means that their production capacity is limited by the amount of human labor available. Consequently, the success rate of the manufacturing process is largely controlled by the quality of the human skills and the speed with which they operate.

Thread, which is created from fibers, both natural and man-made, is the basic material for woven clothes. Natural fibers originated from plants, such as hemp, cotton, water hyacinth, pineapple, etc., but animal-derived materials do not develop due to environmental concerns. Thread is the raw material used to make woven cloth, and the quality of the thread greatly influences the quality of the cloth produced. In addition to threads, the quality of the textile is affected by the colors and motifs used (Setiawan, et al., 2014) as well as the thread material and the fabric structure (Barburski, 2009). The thread's condition determines the overall construction of the cloth.

Thus, threads with large numbers have small diameters, and *vice versa*. The smaller the thread diameter, the better the knitted or woven product, and it eventually affects the architecture of the woven cloth. The desired construction of woven fabrics serves as the foundation for establishing the fineness and density of threads, looms, the processes to be carried out, the efficiency of production costs and the productivity of work methods (Semuel, 2022).

The weaving technique such as joining threads transversely and lengthwise or crossing the weft thread and warp threads alternately used to make a braid (Ciptandi, 2020). This concept has resulted in numerous developments in motifs, patterns or image shapes on sheets of cloth that the weavers refer to when weaving. There are two options for producing *lurik* woven motif designs: *lurik* motifs and gradation motifs. The *lurik* motif, or color distribution between warp threads (elongated threads), is intended to be alternating and repeating colors, such as black,

brown, black, brown, and so forth (Mulyanto, 2018). Meanwhile, the gradation motif, which is the distribution of the colors of the warp threads and the distribution of the width or number of threads in each color, may not be identical. The color is gradated according to the designer's preferences, despite in general, this gradation motif is a composition of the same or matching colors (Suprayitno and Ariesta, 2014).

For example, the fabric is 2800 threads and is made up of black threads (200 threads), brown thread (500 threads), red threads (100 threads), yellow threads (400 threads), white threads (600 threads) and so forth. Based on the design of these motifs, this paper examines the aspects that are related to calculating the proportional number of thread colors, as well as stages of the production process such as motif design, thread coloring, spooling, sewing, warp thread, weft adjustment and weaving (Dyah, 2022).

Its aim is to understand how to develop pattern designs for the traditional lurik woven fabrics/ The objective is to develop a pattern using an innovative strategy of graded color warp threads and various color weft threads to reach a wider target audience.

Research Methods

The selected setting of this action research project was at Ms. Suliyem's weaving company in Tlingsing Village, Cawas, Klaten. The research was carried out from August to November 2022. There were eight employees involved, with four working at Suliyem's house and four others working on a wholesale basis at their respective houses. Participatory approaches, individual and independent learning, adult education and methods of increasing creativity were applied in this activity (Flanagan, 2015). Participatory approach involved especially the development of woven motif design activities including cooperating businesses. These included entrepreneurs, designers, thread dyers, tailors, and weavers to actively participate in all the activities in their respective fields of work (Kaufman, 2019).

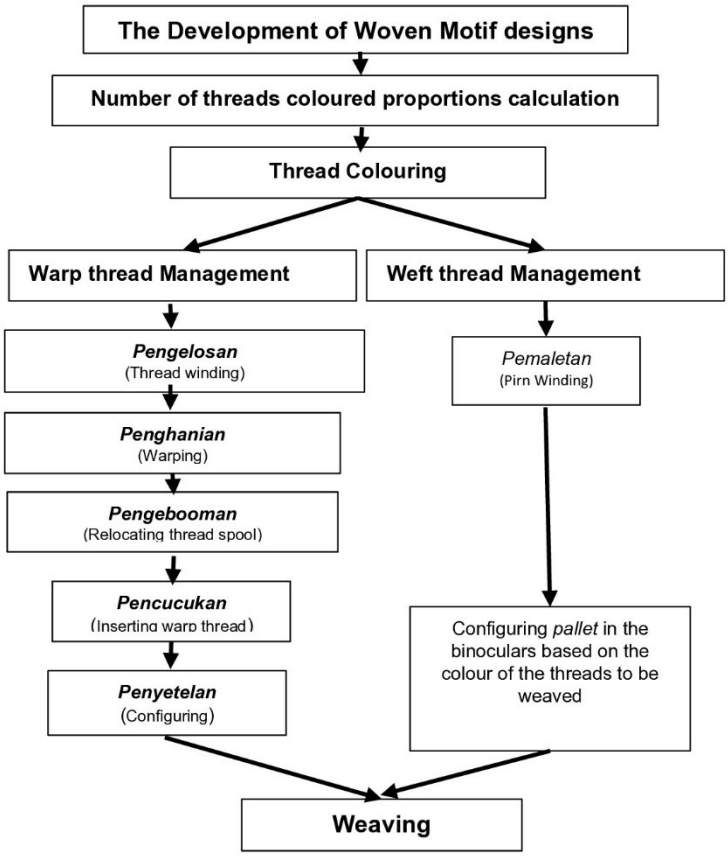
Approach to self-learning or adult education in which trainees are given flexibility during training, and the type and level of difficulty of the material delivered vary according to the level of readiness, competence and condition of the facilities owned by the employees (CrenguĠa, 2014). Basically, adults comprehend their level of expertise, the types of issues they encounter, and the risks which these issues create. The method for promoting creativity is to develop the creativity of every employee, mainly the theme designer and carpenter, by offering mental and security freedoms (Timbadia and Khavekar, 2018). The woven production work process is a ‘artwork process’ requiring a great deal of creativity from the artisans, and the woven goods produced by employees should not be mocked or scolded (Vaughn and Jacquez, 2020). These woven motifs have been developed with many variables in mind, including aesthetics, function in clothing, economy (affordable pricing by customers), ergonomics (product comfort when worn), quality, socio-cultural environment, and natural environment (Angelova, 2023).

Findings and Discussion

Lurik is a cloth made by weaving using a non-machine weaving tool (Alat Tenun Bukan Mesin - ATBM) or a simpler loom, especially *gedhog* weaving, commencing with a single thread and converting it into a piece of cloth based on a prepared motif (Nursari and Nikma, 2022). The stages of manufacturing for *lurik* motif woven clothes with non-machine looms (ATBM) are as follows:

(1) Developing the *lurik* motif designs.
(2) Calculating the length of the fabric to be developed, as well as the number of threads to be dyed, both warp and weft threads.
(3) Making dyed dough for each type of colour used, followed by dyeing the thread using the dyeing procedure.
(4) Warping thread management, which involves loosening, tying, booming, shearing, and adjusting.
(5) Managing the weft thread, which includes palletizing and binocular adjustment; and

(6) The act of adjusting the warp and weft threads, followed by the weaving process (Temesgen, 2018).



The Development of *lurik* Woven Motif Designs

Design development needs, for *lurik* cloth as a traditional textile remains viable and keep up with the times (Badriyah, 2018;Skoglund, 2021). To preserve the identity of the textile tradition, efforts must be made with an appropriate strategy. Ciptandi (2018) and Ju and Lee (2020) say that innovation plays an important role in enticing consumers. Product innovation can never be addressed independently from the design aspect. Design refers to the patterns, shapes and the configurations of the pieces created by hand (Aldich, 1969), carried out with the objective to shift existing conditions into the desired states (Hobday, 2011), in addition to fulfilling or stimulating consumer demands and desires (Guo, et al., 2016). The position and role of design is essential not only for the producers or industries, but also for consumers. The first thing a consumer should do is to see (Guntur, 2021), so, it can be construed that a design with its visuality is always the most prominent (Gaus, et al., 2013).

The example in this paper is the first design developed in the form of a gradation striated motif, namely the colours of the warp threads consisting of red, white, green, yellow, and blue. The colour sequence is red, white, red, green, white, green, yellow, blue and white-green. Alternately, while the colour of the weft threads is identical (white) (Figure 1), the second design, namely the colour sequence of the warp threads is the same as the first design, but the colours of the weft threads are alternately dyed (Figure 2) (Nugroho, 2019).

Fig. 1: *Lurik* weaving design of identical coloured weft thread.

Fig. 2: *Lurik* weaving design of coloured weft thread.

Thread Colouring Calculation

The thread colour calculation stage, involving counting the amount of warp and weft threads depends on the *lurik* motifs to be worked on (Figures 1 & 2). This design is based on the cloth width, the length of the cloth and the kind of colour to be made, and the comparison of thread requirements for different schemes of colours. Referring to the Figure 1, the width of the cloth to be developed is about 110cm, or about 2850 threads. The cloth to be developed is about 200 meters long (Adabala, et al., 2003). There are five types of colours used, namely red, green, yellow, blue and white (the original colour of the thread).

Based on the design in Figure 1, the fabric plan width is 110cm. The colour order of the warp threads is 14 cm red width; 3 cm white width; 3 cm red width; 3 cm green width; 3 cm white width; 21 cm green width; 23 cm yellow width; 13 cm blue width; and a width of alternating white-green 17 pairs (27 cm). The colour of the weft thread in design 1 is identical. In contrast to the design 2 (Figure 2), the colour order of the warp thread in design 1 is the same, but the weft colour kinds are different. As the type of thread used for the weft changes every 22 cm in design 2, particularly brown, white, green, yellow and blue, the colour composition of the ultimate weave also varies (Kavita and Abdel, 2011).

A comparison of the sorts of colours in the design to be worked on can be used to calculate the total number of threads to be dyed and the amount of coloration required (Figure 1). Based on the design in Figure 1, the red colour appears twice as wide in Table 1 as 14cm and 3cm = 17cm, or 362 threads and 78 threads = 440 threads, or 15.4%. The green colour appears three times as wide as 3cm + 21cm + 13cm = 37cm or 78 + 544 + 337 threads = 984 threads or 34.5% of the total width. The yellow colour appears once as wide as 23cm and as much as 596 threads or 21% of the total time. With 337 threads or 11.8%, the blue colour shows once as wide as 13cm. The white colour appears three times as wide as 3cm + 3cm + 14cm = 20cm or 78 + 78 + 362 = 493 threads or 17.3% of the total width. Thus, the amount of warp threads to be dyed red, green, yellow, and blue can be calculated, namely 15.4%, 34.5%, 21.0%, 11.8%, and undyed thread (still white). The proportion is multiplied by the number of threads required in total. Therefore, the number of colours required can be varied based on the proportion of thread to be coloured (Antonius, et al., 2022).

Table 1: The number and proportion of thread colours calculated.
Source: Author

Designs	Colour types	Width /cm	Number of threads	Total number of threads	Percen tage
	Red	14	362	440	15,4%
	White	3	78	-	-
	Red	3	78	-	-
	Green	3	78	-	-
	White	3	78	-	-
	Green	21	544	984	34,5%
	Yellow	23	596	596	21,0%
	Blue	13	337	337	11,8%
	White	14	362	493	17,3%
	Green	13	337	-	-
Total		110	2850	2850	100,0%

Warp and Weft Thread Management

The thread is then dyed to fit the colours in the design. Based on the above design (Figure 1), if 200 meters are to be created with identical weft colour, i.e., white, then 20kg of thread is required. Thus, the total amount of colours to be dyed can be estimated as follows: warp thread 50% x 20kg = 10kg and weft thread 50% x 20kg = 10kg. The proportion of red warp thread is 15.4% x 10kg = 1.54kg, green thread is 34.5% x 10kg = 3.45kg, yellow thread is 21.0% x 10kg = .2.1kg, blue thread is 11, 8% x 10kg = 1.18kg, and white thread 17.3% x 10kg = 1.73kg. Thus, the thread to be dyed is only about 20kg -11.73kg = 8.27kg.

Furthermore, the stages of the warp thread management process are as follows: (1) the process of spinning threads, in which the threads are wrapped up on spools after being coloured and dried. (2) The technique of removing or removing threads in which the warp thread is ordered using a *hani* or *sekir* tool according to the order of the colours and the number of threads in each group of coloured thread. (3) The warped threads are then taken to the boom, a process known as booming. (4) The yarning procedure, which involves successively placing the warp threads (up to 2850 threads) on the gun eye and comb (Figure 4). (5) Warp thread adjustment on the loom (Durđica, et al., 2014).

The major stage in the process of manufacturing *lurik* weaving is the *penghanian* or the warping process. It is the stage of the knitting process when the colour sequence of the warp threads is compiled according to the colour sequence and the number of thread strands in the design to be developed. In design 1, there are 9 thread groups, which were first arranged as follows: (1) groups of red thread were wrapped up as much as 362 threads of each thread 200 meters long. Then (2) 78 strands of white thread, (3) 78 strands of red thread, (4) 78 strands of green thread, (5) 78 strands of white thread, (6) group of 544 strands of green thread, (7) 596 strands of yellow thread, (8) 337 strands of blue thread, and finally 362 and 337 strands of alternating white-green thread. Each spooled thread is 200 meters long. (Table 1 and Figure 3).

Fig. 3: The process of warping, configuring the order of the warp threads on the boom according to the design
Source: Author

Fig. 4: The process of inserting warp threads into a gun eye.

Fig. 5: Weft weaving on warp threads with ATBM tools.

All the 2850 warp threads assembled on the boom must be the same length. Each warp thread in this study is 200 meters long. If there is a set of warp threads that are less than 200m long (e.g., due to a miscalculation or forgetting to count), the final woven fabric will result in a damaged cloth with areas of the cloth missing warp threads (Figure 6). Interestingly, up to three meters of thread can be rolled in one turn of wrapping (*sekir*) (Wijayanti, 2019).

Weft thread management stages consist of

(1) thread colouring.

(2) thread winding on a pallet.

(3) inserting the pallet thread into the binoculars and

(4) the binoculars are set on the ATBM tool to weave.

The proportion of weft thread to be coloured is adjusted to the design. If you are going to make design 1 (figure 1). Then the colour of the weft thread is the same, but if you are going to make the weft color graded (different) like design 2 (Picture 2) then the number of colours of the weft thread is adjusted. In this case there are 5 colours of weft thread. Thus, each colour is 2kg (10kg: 5 colours).

Fig. 6: The last woven product was broken 1 meter

The Process of Setting the Warp and Weft Thread

The weaving and finishing process consists of six steps:

(1) opening the warp mouth, which is divided into two parts forming a pyramid-like area as a gap to insert the weft thread.

(2) opening the warp mouth.

(3) opening the warp mouth.

(4) opening the warp mouth. and

(5) opening the warp mouth.

(6) Weft launching, i.e. moving the binoculars that carry the weft left and right, entering the warp strands to make woven.

(7) Weft sealing, or tightening weft threads that have penetrated warp threads.

(8) Warp thread stretching, i.e., the weaver stretching the warp threads from the weaving boom during the weaving time

(9) Cloth winding, or rolling a woven cloth once it has reached a particular length (thickness of the roll 5cm - 8cm).
(10) Cleaning of remaining threads, particularly cleaning up leftover thread and thread waste that is still attached, thread joints, and cloth sheet softening.

In this study, two *lurik* woven motifs were developed:
(1) the *lurik* woven motif of graded warp threads combined with weft threads of a similar color (Figure 7), and
(2) the *lurik* woven motif of graded warp threads combined with alternately colored weft threads (Figure 8).

Fig. 7: *Lurik* cloth with identical colorful weft thread as an outcome of design 1.

Fig. 8: The *lurik* cloth developed using design 2, with different weft thread colours**.**

Fig. 9: Man's shirt made using *lurik* woven cloth with various weft threads.

The development of lurik woven motifs produced in this research has been implemented as clothing products with various motifs (Figure 9) and has received a good response from the consumers. One of them is a fashion designer who uses colored weft striated woven fabric as the main material for their designs. Optimism regarding the product resulting from the development of lurik weaving is that international market demand is increasing, in line with post-pandemic global conditions which are gradually improving and becoming more conducive.

The development of *lurik* woven motifs in Pedan, Klaten, Central Java, Indonesia, is an attempt to preserve the local cultural heritage (Inanna, et al., 2020). The study corresponds directly to the educational element, which aims to raise public awareness about local potential that can be processed for the global target market, especially fashion. Dying weft is a creative strategy that falls under the heading of basic innovation. The *lurik* products that arise from these innovations offer a touch of originality and a high selling value. Traditional textiles from Indonesia are government assets that can be taken advantage of for fashion interests (Kahdar and Yanyan, 2013). Indonesian fashion derives its features from the diversity of traditional textiles, which are diversified, rich in colours and patterns, contain deep philosophical meaning, and are contemplative in the process. Each has the potential to be managed as a high-end fashion product.

Conclusion

Textile technology has advanced rapidly since the industrial revolution to the current Artificial Intelligent (AI) period. Consequently, both positive and negative effects have emerged. The majority of the beneficial outcomes are felt by business owners, particularly the profits generated as a result of the capacity to manufacture quality products at low manufacturing costs. At the same time, these entrepreneurs are ignoring the adverse effects such as environmental damage caused by post-production waste or residue. Because there is no super-effective technique to handle significant post-production waste at the moment, tight controls and rules must be regularly imposed to keep it under control.

Traditional efforts to promote *lurik* weaving continue. However, non-machine weaving tools (Alat Tenun Bukan Mesin - ATBM) are still used. The main reason that traditional techniques remain in use, notwithstanding the fact that there are prospects for progress towards industry is such that post-production waste control can continue to be carried out, which prevents damaging the environment. It is as simple as paying attention to the number of orders, production capacity and human resources (HR) involved in forward-thinking manufacturing to ensure environmentally friendly conditions. The development of *lurik* weaving using unique coloured weft threads has a vision of conserving community works for culture instead of becoming easily entangled by the chase of profit, which ultimately results in disasters.

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