



## Digital Print Textile Pattern Designs for Fashion Products

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Received: Nov 14, 2023; Revised: Nov, 27, 2023; Accepted: Dec 18, 2023; Published online: Dec 28, 2023

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### Abstract

The aim of this research has twofold 1) to design digital print textile patterns for fashion works; and 2) to evaluate the satisfaction on digital print textile. This research includes a sample group of academics, professors, entrepreneurs, manufacturers, and consumers, who have relevant experiences in the fields of textile product design, textile industry, product design, and graphic design. Research instrument consists of questionnaire on personal information of respondents, questionnaire on design analysis and conclusion, and satisfaction evaluation form. Statistics used in the research are percentage, mean ( $\bar{x}$ ), and standard deviation (S.D.). Research result reveals that the woven fabric made from mixed cotton-Nypa palm fibers being developed was ideal for making textile works as they provided value, value added, and functionality for further extension of textile works. The analysis was performed on the data acquired from the investigation using interview form on the design of fashion textile products to collect field data from textiles companies, garment factories, department stores, markets, digital printing houses, and related design schools. The data was used to develop designs with the steps of designing digital print textile patterns to fashion products. Analysis results from the questionnaire on the opinion of experts and the survey of consumers aged between 20 – 30 years, 31 – 40 years, and 41 years and over pertaining to their opinion towards the sketch designs of clothing and bags being developed. Results found that product functionality ranked first followed by beauty to use, and designs to regard environment conservation, respectively. Satisfaction on the design of digital textile patterns show the highest mean on fine proportion of patterns, followed by proper scale of patterns, and continuity of pattern that affect print patterns. The result of the print pattern fabrics causes no skin irritation when wearing and offered color fastness despite several times of washes.

**Keywords:** Textile printing, Woven fabrics, Digital system, Fashion design

### Introduction

Today, products made from woven fabrics have gained a broad popularity for their distinctive features of wearing comfort and unique beauty. Fibers or materials both natural and man-made can be formed into fabrics. Advances in printing technology have brought many changes in this business. The trend of print production involves technologies widely developed to meet the demand of consumers. These include the improved quality of work pieces along with printing speed, color, number, and size or even large size of print material. Moreover, the rise and expansion of digital printing has led to the demand for textile printing extensively. Research and development serve to extend the digital printing knowledge by means of developing techniques or methods that are applied and experimented until yielding satisfied results to be further disseminated and used extendedly for improving efficiency. Fashion design is a type of human's creative process with visual elements and their



characteristics as components, and theories adopted as guideline. Designers work on many steps in the creative process to produce design works to satisfy the needs for daily living, more convenience at use, or resolving functional physical problems, improving human way of life for better quality than before.

Graphic works was termed in different Thai words pronounced as Lekanasil, Rekanasil, Lekasil. A type of graphic works of the researcher's interest was called fabric graphics like textile graphics, patterns, and designs as a combination of production technique and creativity to match the preference of consumers. Digital print textile patterns and design to fashion designs in each step requires respective specialists to work together even in the distribution of products that experts need to present to make sure consumer desires are met. Fabric of each type varies in functionality for consumers to choose from by their intended use. They make a choice considering fabric quality, beauty, functional suitability, and purchasing power. In the design and digital textile printing pattern to pattern design, the use of colors to print patterns on fabric even with white color on white fabric can produce vivid patterns. This type of pattern is called decorative design created by printing different forms and looks of patterns such as lines, shapes, and colors that are well-arranged and suitable for materials intended to produce.

With the charm of fabric patterns, new generation of designers are interested in designing clothes with change in styles of both the design of woven fabric patterns and decoration on fabrics with new technique to go along with the era, making the products look different and more contemporary, while practical and modernized in everyday life. Fabrics printed in a range of patterns are cut and decorated to match contemporary clothing like shorts, T-shirts, suits or jackets wearable by both women and men, and match the clothes popular among those who love to dress up in fashionable outfits. They accompany the current preference of trendy clothing in both the outfits such as shirts, pants, skirts as well as accessories and bags. The current styles of fashion among Thai people are mostly influenced by those countries in East Asia, for example, fashion culture from China, Japan, and South Korea, including technological trends. Moreover, unisex fashion has been growing worldwide until the year 2021 that wearing skirts and dresses have become common in everyday life, including fashion products as seen on social media.

The investigation of information on woven fabrics, tests of their physical properties, the process of pattern design and technology for textile pattern printing, and the designs of fashion products were undertaken to seek for the efficiency and quality of digital print textiles to fashion design and add value to products.

## Objectives

1. To design textile patterns for digital printing in fashion works.
2. To evaluate the satisfaction on digital print textiles.

## Methods

To acquire the information under investigation by the research objectives on digital print textile to fashion design, the following procedures are carried out. Analysis was performed on the data obtained from the search and interviews using an interview form on digital print textile to fashion design, to gain information for designs. Field visits were conducted to companies, fabric selling places, fashion garment factories, department stores, digital textile pattern printing factories, and related design schools. The data was analyzed for later designs and development. The analysis steps included analysis of questionnaires to find mean and standard deviation, with interpretation criteria to classify the level of mean in particular range.



## Results

Data analysis prior to creating designs was performed in different parts. Satisfaction to choose and purchase digital print textile products was evaluated among consumers aged between 20 – 30 years, 31 – 40 years, and 41 years and over. Respondents aged 20 - 41 years and over reported the top rank for choosing the clothes wearable by both men and women from digital print pattern textile.

Table 1 Analysis result on personal information of respondents

	Frequency	Percentage
<b>1. Sex</b>		
1.1 Male	47	47
1.2 Female	53	53
<b>Total</b>	<b>100</b>	<b>100</b>
<b>2. Age</b>		
2.1 20 - 30 yrs.	27	27
2.2 31 - 40 yrs.	38	38
2.3 $\geq 41$ yrs.	35	35
<b>Total</b>	<b>100</b>	<b>100</b>
<b>3. Education</b>		
3.1 Lower secondary	4	4
3.2 Higher secondary	12	12
3.3 Bachelor's degree	44	44
3.4 Higher than bachelor's degree	40	40
<b>Total</b>	<b>100</b>	<b>100</b>
<b>4. Position/Occupation</b>		
4.1 Student	24	24
4.2 Employee of private company	35	35
4.3 Private business/Trade/Freelance	20	20
4.4 Academics/Public servant/State enterprise	11	11
4.5 Others	10	10
<b>Total</b>	<b>100</b>	<b>100</b>
<b>5. Income/month</b>		
5.1 5,000-10,000 baht	10	10
5.2 10,001-20,000 baht	14	14
5.3 20,001-30,000 baht	25	25
5.4 30,001-40,000 baht	40	40
5.5 $\geq 40,001$ baht	11	11

The patterns were inspired by palm trees, with three forms of the same proportion and continuation of the patterns for printing on fabrics.


**Figure 1** Pattern 1

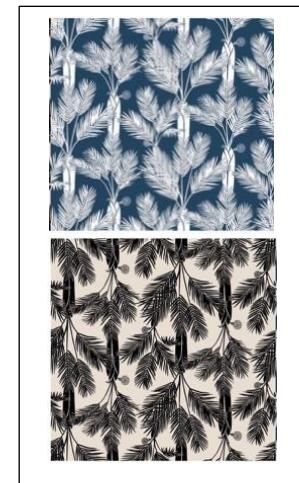
**Figure 2** Pattern 2

**Figure 3** Pattern 3

Table 3 Analysis result of draft digital print textile patterns

No.	List	$\bar{x}$	S.D.	Interpretation	Rank
1	Pattern 1 Horizontal Nypa palm leaves	3.45	0.90	Moderate	3
2	Pattern 2 Graphic Nypa palm leaves	4.80	1.00	Highest	1
3	Pattern 3 Vertical Nypa palm leaves	3.50	0.95	High	2

Analysis result on the opinions towards digital print textile patterns suggests that pattern 2 was rated with highest total mean, followed by pattern 3 and pattern 1, respectively.


**Figure 4** Ideal patterns for making products

Table 4 Satisfaction towards the designs of digital print textile pattern

No.	List	$\bar{x}$	S.D.	Interpretation
1	Fine proportion of textile patterns	4.80	1.07	Highest
2	Proper scale of patterns	4.77	1.00	Highest
3	Balances of pattern elements	4.54	0.95	High
4	Rhythm, pattern, repetition	4.50	0.91	High
5	Harmony of patterns	4.55	0.96	High
6	Emphasis, dominance, and hierarchy	4.35	0.85	High
7	Differences making distinctive patterns	4.35	0.85	High
8	Perceived stories of textile patterns	4.30	0.86	High
9	Continuity of patterns	4.61	0.80	Highest
10	Overall satisfaction on textile patterns	4.52	0.95	Highest

Result of evaluation on satisfaction towards the designs of digital print textile patterns showed that for individual aspect, fine proportion of patterns was reported with the highest mean, followed by proper scale of patterns, and continuity of patterns, respectively.

Synthesis of result found a number of issues in common or preferably use as criteria pertaining to the principles of graphic design, and they were applied as criteria for digital print textile to fashion design. The standard criteria mostly used for evaluating by the principles of graphic design were employed to evaluate the following aspects: 1) Balance, 2) Rhythm, pattern, repetition, 3) Unity, 4) Emphasis, dominance, hierarchy, and 5) Fine proportion.

Based on the analysis of evaluation result, the sketch patterns rated highest by experts and consumers were taken by the researchers to develop and improve as digital print product designs into fashion design as shown below.



**Figure 5** Designs of digital print textile patterns in different types of clothing



**Figure 6** Design of digital print textile patterns in 3 types of bags



**Figure 7** Design works of digital print patterns on woven fabrics of cotton-Nypa palm fibers before making into fashion products of different types of clothing.



**Figure 8** Design works of digital print patterns on woven fabrics of cotton-Nypa palm fibers before making into different types of bags



Table 2 Sketch designs of clothing and bags

No.	List	$\bar{x}$	S.D.	Interpretation
1	Functionality	4.70	0.97	Highest
2	Beauty to use	4.67	0.96	Highest
3	Sturdiness	4.53	0.94	Highest
4	Material	4.50	0.90	Highest
5	Production process	4.56	0.95	Highest
6	Safety	4.35	0.88	High
7	Price	4.30	0.85	High
8	Maintenance	4.32	0.86	High
9	Delivery	4.01	0.80	High
10	Environmental conservation	4.59	0.95	Highest

Analysis result on the opinion towards the sketch designs of clothing and bags for individual aspects suggests that functionality ranked first, followed by beauty to use, and environmental conservation, respectively.

Synthesis of result found a number of common issues in common or preferably use as criteria pertaining to the principles of graphic design, and they were taken as criteria for digital print textile to fashion design. The standard criteria mostly used for evaluating by the principles of graphic design were employed to evaluate the following aspects: 1) Functionality, 2) Beauty to use, 3) Material, and 4) Production process.

## Discussion

Based on the study result of the digital print textile and fashion design; there are certain aspects for further discussion which are;

**Issue 1:** Digital print textile to fashion design. Amarin Srisupornvanich (2021) provided an overview of Thailand textile and garment industry in 2022 with an opportunity to grow by 10-15% due to the recovery and the turn of purchasing power. This group of products is considered indispensable especially for the Thai weaving or textile industry as the upstream of garment industry. It thus requires the development to add value and create new opportunities following the theory of making good use of natural resources and promoting sustainability, including sustainable design. The fabric texture needs to be different from those on the market and can be further developed in pattern printing process.

**Issue 2** Satisfaction towards digital print textile to fashion design. Evaluation of consumers' satisfaction towards product development reported that consumers rated highest score of satisfaction on fashion clothing products. Male and female consumers aged between 20 – 41 years and over gave their opinion on proper functional style as well as beauty. According to a research conducted by Jittapon Chumkate (2017, pp.10-11), product designs should satisfy the need and demand of consumers and offer product diversity, quality, designs, styles, beauty, sturdiness, and services; for example, to be more advantage than the products of competitive others. Consistently, Rewat Suksikarn (2013) suggested about the components of products which included affordable and inexpensive price, less decision time, instant purchase on preference without thinking too hard, a range of prices to choose from as suitable, beauty and attraction, novel and eye-catching styles, and signifying local uniqueness. In similar, development of commercial products from Napa palm fibers should offer not only beauty and uniqueness but also proper sizes, all that meets the requirement and win the heart of consumers in the present and future time, and allow for further development commercially (Nirat Soodsang, 2016).



## Recommendations

1. The production method can be further developed with the production process technique attuned to the new and diverse technologies for comparative value and beauty.
2. The production process can be further applied to textile printing for weaving works or combined into digital print process so as to offer a wide range of textile production and construction of business.
3. Print pattern textiles, other than their use for clothing production, are also suitable for producing many other products to generate their worthiness and value.

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