

Studying and Product Development of Handicraft from Elephant Dung Paper for Adding Income to Community at Changwat Phra Nakhon Si Ayutthaya

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Abstract

The research aimed to study and develop handicraft products from elephant dung paper for community income generation in Changwat Phra Nakhon Si Ayutthaya and to compare the product satisfaction of the target group for the original style and the new one of elephant dung paper. The target group was composed of 143 tourists from other provinces and 143 local tourists. Both target groups would like to buy handicraft products from elephant dung paper and help generate community income in Changwat Phra Nakhon Si Ayutthaya. Research tool used were questionnaire and data were analyzed by statistical percentage, mean and mode. Questionnaire was used for the product attributes satisfaction evaluation of the target group including alternative evaluation process and comparison of product styles evaluation process. Data were analyzed by statistically percentage, mean and t-test dependent sample. The results were as follows:

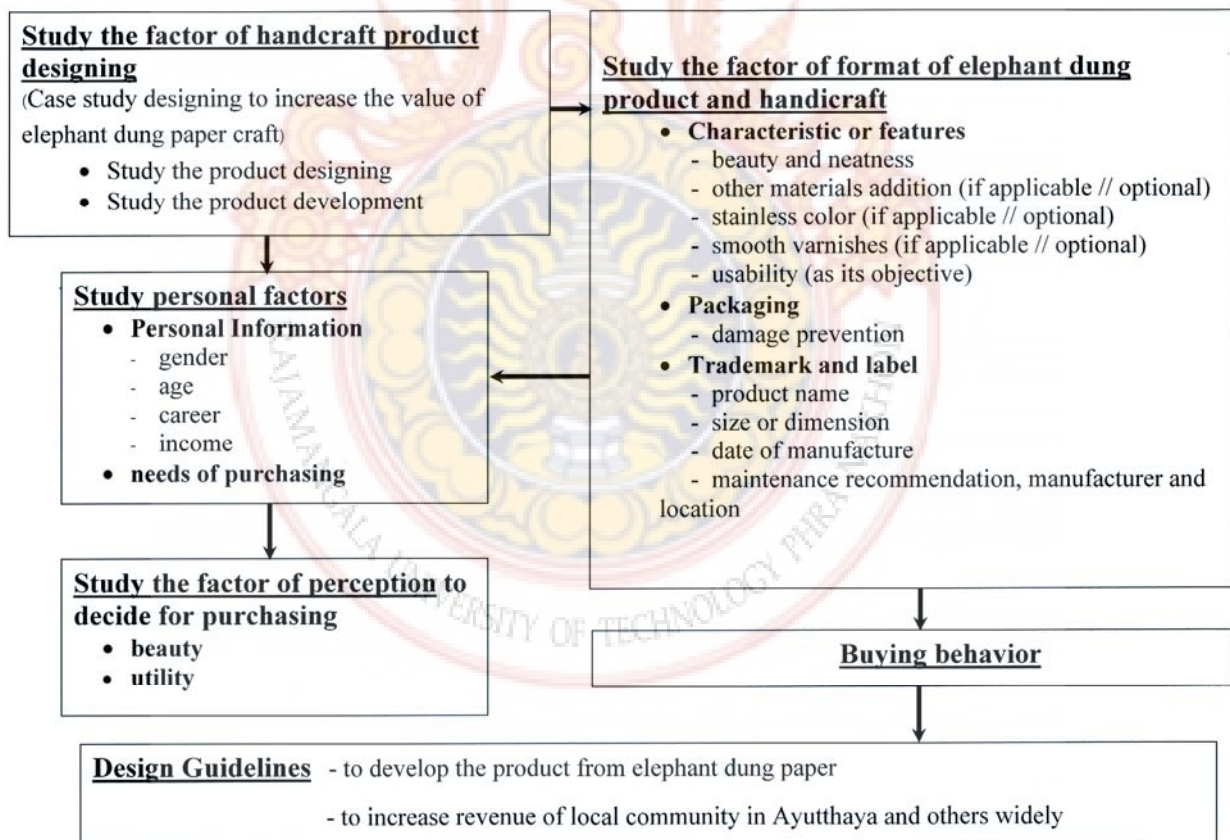
1. The target group chose the third style on 3 designs of handicraft products from elephant dung paper.
2. For the product attribute satisfaction of the target group, it was found that the new style of handicraft product was more acceptable than the original one at a significance level of 0.05.

Key words: elephant dung paper, community at Changwat Phra Nakhon Si Ayutthaya

1. Introduction

Thai handicraft products are applied and developed from local natural and synthetic materials. Then, local handicraft becomes product an identified of that area. The elephant is a raw material which does not need investment. The elephant is a symbol of Thailand. Currently, there are a large number of Elephant Conservation Centers. This research focused on Wang Chang Ayutthaya Lae Panead (Ayutthaya Elephant Camp). Each elephant excretes approximately 6-12% of its weight every day. This provides plenty of dung and contamination because an elephant defecates approximately 60% of food eaten. Thailand is the agricultural country. Local knowledge is also developed from agricultural to handicraft products and has been seen widely. Therefore, designers should realize and emphasize handcrafted products to be more widely accepted as the identity of Thailand.

Researchers as designers are aware of and give precedence to wasted elephant dung. There was handicraft product development in order to increase the value of elephant dung and decrease pollution. The objectives of this research were processing of elephant dung to paper, being a sample center of dung recycling include, being a standard of Ayutthaya community and entrepreneurs. Therefore, elephant dung has been processed to several non-smell craft products. For examples, notebooks, photo albums, postcards, magnets, colored and non-colored paper. Then, there was satisfaction surveying of elephant dung products to sample. The result was there was higher satisfaction of new product than original product in order to reach target needs and increase income to local people and improve the country's economy.



2. Materials and Methods

2.1 Exploration

Study and develop elephant dung paper handicraft in order to increase income to local people in Changwat Phra Nakhon Si Ayutthaya and all elephant-related entrepreneur. Hypothesis was satisfaction of the new product is better than the original. There was a study of perception for buying-decision.

2.2 Surveying factors

Study the theory of conceptual framework in the process of product design and develop the product for use as framework to understand the local intellect, identity and culture. Beauty, interest, innovative style, portability, suitable size, damage prevention and a suitable price affected decision-making for the customer.

Study the evaluation of product satisfaction in various respects between new product and original product. To understand the desired characteristics of elephant dung paper product and to meet the criteria of the Standards Community (TCPS.230/2547) for packaging marking and labeling

2.3.1 The research tools

Formal interviews for collecting general data related to products in order to study and develop them.

Product and distribution was surveyed through formal interviews with specific questions for the product.

A Questionnaire which collects the satisfaction levels of the sample. There are 2 parts, general information and 5 levels of satisfaction of sample.

Assessment form of product designs which were decided on 3 designs in order to prove the hypothesis.

2.3.2 Sampling

The target group was composed of 143 tourists from other provinces and 143 local tourists. Sampling of random customers who purchase elephant dung paper handicraft was done. Random testing was followed by the theory of Yamane (Glenn 2004 cit in Yamane, 1967) which has 5% deviation. There was

statistical testing with semantic differential to test the perceptual of attributes or qualities between 2 products. There was opinion measurement of buyer satisfaction. Then, testing by questionnaire, assessment form of product designs to sample and record their response.

2.4 Analyzing the result

The testing result was analyzed through computer program in order to calculate the average and standard deviation. There was t-test analysis to sum up the satisfaction in features between new product and original product including product development.

The result was summarized by computer program from above to make guideline for handicraft products which make from elephant dung paper in Changwat Phra Nakhon Si Ayutthaya in order to be suitable and acceptable moreover, this was able to increase revenue for local people.

3. Results and discussion

Studying of product design by analysis needs of sample for product purchasing, various features and the products improving, design which reflect to the local Wang Chang Ayutthaya Corral, necessary information to specify on the product, colors and patterns of the product.

General sampling of both males and females in the same quantity was done. Most people sampled were quite old, business owners, had high income and high education.

The objective of purchasing products was as souvenirs for people's family, their boss, elders or cousins respectively.

Categories of needs for target were postcard, notebook, photo album, magnet and colored and non-colored paper respectively.

Evaluation of 3 improving products in order to find the result of satisfaction was done.

Furthermore, there was evaluation between the new product and former product and satisfaction of sample.

The assumption was found that the sample has more satisfaction of various assets

of new product than traditional handicraft products, packaging and characteristics of products in various fields ($P < 0.05$). As shown in the table (below), hypothesis was accepted at $P < 0.05$, significantly different.

The various features of products	Satisfaction level of products						t	p
	New design			original design				
	Mean	SD	Result	Mean	SD	Result		
Characteristic or features								
- beauty and neatness	3.87	.617	high	2.84	.601	middle	30.5*	.00
- other materials addition (if applicable // optional)	4.05	.635	high	2.64	.602	middle	35.1*	.00
- stainless color (if applicable // optional)	3.69	.506	high	2.86	.426	middle	25.3*	.00
- smooth varnishes (if applicable // optional)	3.76	.547	high	2.89	.600	middle	22.3*	.00
- usability (as its objective)	4.11	.624	high	2.98	.612	middle	26.1*	.00
Packaging								
- damage prevention	3.86	.726	high	3.00	.720	middle	19.3*	.00
Trademark and label								
- product name	3.94	.555	high	2.26	.524	low	36.0*	.00
- size or dimension	3.98	.713	high	2.53	.565	middle	28.0*	.00
- date of manufacture	4.19	.567	high	2.03	.560	low	47.2*	.00
- maintenance recommendation	3.58	.647	high	2.29	.631	low	23.3*	.00
- manufacturer and location	3.99	.542	high	2.17	.525	low	37.3*	.00

Table 1 Comparison of the satisfaction level of the new format and the traditional craft.

1. The various features of products

Studying the comparison of satisfaction between the new and original product formats, it was found that there was different between satisfaction level averages for every features ($P < 0.05$) for beauty and neatness. The new handicraft's average of 3.87 was higher than the original handicraft's average of 2.84.

The average about other materials addition for new handicraft was higher than the original. New handicraft has a mean of 4.05 while the original was 2.64.

Color does not mess up feature, the new format with an average 3.69 was higher than the traditional format with an average 2.86.

Finishing feature must be flat, and it found that the new form has mean 3.76 which was higher than traditional format with an average 2.89.

For usability, it found that the new format has a mean of 4.11 which was higher than the traditional design with an average 2.98.

2. Characteristics of packaging products.

Comparing the average of satisfaction with the new product to traditional packaging, all features found that the mean difference were significant ($P < 0.05$).

Packaging includes the prevention of damage for the new form with mean of 3.86 was higher than the traditional with an average of 3.00.

3. Characteristics of trademark and label product.

It found that there were different average level of satisfaction between the new product and traditional packaging ($P < 0.05$).

For product name feature, new model with mean of 3.94 was higher than the original model with an average 2.26.

Mean of new format was 3.98 which was higher than traditional with an average of 2.53 for size or dimension features.

The satisfaction level for the date of manufacture of the new format (4.19) was higher than the traditional (2.03).

As for the recommendations for maintenance, the new form (3.58) was higher than traditional (2.29).

The average of the new format (3.99) which was higher than the original model (2.17) for specifying the manufacturer and production place, as shown in the table (above).

4. Conclusions

4.1 The results.

The sample was made up of were males and females. Most were quite old, business owners with high income and education levels. Their purposes for purchasing were souvenir for the family, themselves, bosses and cousins respectively. Product types as souvenir of target were postcards, notebooks, photo albums, magnets, colored and non-colored paper, respectively.

The assumption of satisfaction in various features of the target was found that there was higher satisfaction with the new handicraft product than traditional handicraft products.

The various features of products were colors lack of messiness and refinement. The glaze must be smooth. Products were used for traditional purposes. Product can be seen clearly, suitable for being exotic and notable souvenirs. Moreover, there were attractive graphic designs to present the image of elephant dung paper handicrafts from Wang Chang Ayutthaya Lae Panead Ayutthaya Elephant Camp.

There was clear useful information about the product. The product details were specified as required by the criteria of the Standards Community (TCPS.230/2547) in order to enhance confidence and honesty to the buyer. Furthermore, the uniqueness of the local product by using elephant, elephant dung and corral as illustrations to represent the production place and identity were accepted by local people and tourists.



Figure 1 Prototype of elephant dung paper.



Figure 2 Transfer of technology to Community At Changwat Phra Nakhon Si Ayutthaya.

4.2 Recommendations for next research

To use the product as a selling tool, studying the changes of related factors is needed in order to make buying decisions for customers without hesitation as an important function of the product.

The results of this research were able to be used in a particular region and a period of time. Studying each factor involved in the product design of each area, such as culture and local intellect was interesting.

Conclusions can be applied and used for the product in order to reach a standard, receive acceptance and meets the needs of target group. These results of this research were available for others as a guide in developing elephant dung products in Changwat Phra Nakhon Si Ayutthaya or other areas.

4.3 Recommendations for implementation from this research

1. The research can guide the design of products from elephant dung paper. Most entrepreneurs were focused on using high contrast color for their product in order to attract customers and be outstanding.

2. The research can guide the product design for elephant dung paper manufacturer groups in Changwat Phra Nakhon Si Ayutthaya. Elephant and corral as identities of local products reflect Thai identities clearly. Moreover, these identities attract and make recognition for tourists.

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6. References

- [1] วิษรินทร์ จรุงจิตสุนทร. 2548. **หลักการและแนวคิดการออกแบบผลิตภัณฑ์**. กรุงเทพฯ : Idesign Publishing.
- [2] วังช้างอยุธยา แล เพนียด. 2553. **กระดาษมูลช้าง** [Online]. Available : <http://www.changdee.com>.
- [3] สฐิตารีย์ ทิมจำลองเจริญ. 2548. **การพัฒนางานด้วยระบบคุณภาพและเพิ่มผลผลิต**. กรุงเทพฯ : แม็ค จำกัด.
- [4] ดำรงศักดิ์ ชัยสนธิ. 2537. **การบรรจุภัณฑ์**. กรุงเทพฯ : วังอักษร.
- [5] ทองเจือ เขียดทอง. 2542. **การออกแบบสัญลักษณ์**. กรุงเทพฯ : สิปประภา.
- [6] นิรนาม. 2529. **มาตรฐานผลิตภัณฑ์อุตสาหกรรมกระดาษเหนียว มอก 170-2529** สำนักมาตรฐาน ผลิตภัณฑ์อุตสาหกรรม กระทรวงอุตสาหกรรม กรุงเทพฯ.
- [7] นิรนาม. 2533. **มาตรฐานผลิตภัณฑ์อุตสาหกรรมกระดาษพิมพ์และกระดาษเขียน มอก. 287-2533** สำนักผลิตภัณฑ์อุตสาหกรรม กระทรวงอุตสาหกรรม กรุงเทพฯ.
- [8] นิรนาม. 2533. **สถานภาพและการใช้ประโยชน์ถ่านลิกไนต์และวัสดุเหลือใช้การเกษตรในภาคอุตสาหกรรม**. รายงานสัมมนาทางวิชาการโดยศูนย์วิจัยและอบรมพลังงาน. จุฬาลงกรณ์มหาวิทยาลัย, กรุงเทพฯ.
- [9] นิรนาม. 2533. **สถิติการเกษตรของประเทศไทยมีเพาะปลูก 2535-2536** ศูนย์สถิติการเกษตร. สำนักงานเศรษฐกิจการเกษตร, กรุงเทพฯ.
- [10] พงษ์ธาดา วุฒิการณ์ และยลฤดี วุฒิการณ์. 2541. **ศิลปะบรรจุภัณฑ์ในเมืองเกียวโตและเชียงใหม่ : ในมุมมองทางสังคมและวัฒนธรรม**. เชียงใหม่ : มุลนิธิขุมิโตะโมะ.
- [11] ศูนย์อนุรักษ์ช้างไทย. 2549. **Elephant Show** [Online]. Available : <http://www.thailandelephant.com/aboutus.php>.
- [12] ศุภางค์ศรี อ่ำสุดใจ. 2546. **กลยุทธ์ตลาด**. กรุงเทพฯ : แม็ค จำกัด.
- [13] ศิริวรรณ เสรีรัตน์. 2538. **พฤติกรรมผู้บริโภค ฉบับสมบูรณ์**. กรุงเทพฯ : พัฒนาการศึกษา.
- [14] ศุภางค์ศรี อ่ำสุดใจ. 2546. **กลยุทธ์ตลาด**. กรุงเทพฯ : แม็ค จำกัด.
- [15] สถาบันวิจัยวิทยาศาสตร์และเทคโนโลยีแห่งประเทศไทย. 2545. **การพัฒนาบรรจุภัณฑ์สำหรับผลิตภัณฑ์ทุเรียนแปรรูป**. กรุงเทพฯ : ม.ป.ท.
- [16] สถาบันขยายผลแห่งชาติ ในพระอุปถัมภ์ สมเด็จพระเจ้าพี่นางเธอ เจ้าฟ้ากัลยาณิวัฒนากรมหลวงนราธิวาสราชนครินทร์. 2549. **ศูนย์อนุรักษ์ช้างไทย องค์การอุตสาหกรรมป่าไม้**. [Online]. Available : <http://www.thailandelephant.org>
- [17] Final Report of The Research project for Higher Utilization of Forestry and Agricultural Plant Materials in Thailand (HUFA) Volume I: 2539-254
- [18] Glen D. Determining Sample Size. [on-line] Available from http://edis.ifas.ufl.edu/Body_pd006. 1 May 2004.