

# Innovative Design of Color Extraction Products from Leftover Flowers Using Virtual Reality with Big Data

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**Abstract** This Innovative Design of Color Extraction Products from Leftover Flowers Using Virtual Reality with Big Data research aims to study the factors effecting product design innovations in order to (1) extract colors from leftover flowers using real-world simulations with big data, (2) create new technological knowledge in virtual reality, (3) produce alternative commercial prototype products. The data collected using in-depth interviews with five related experts with an online questionnaire for a specific sampling of 320 people. After the study, it was found that 1) the overall average of 4.40 with a standard deviation of 0.72. 2) The most obtained process of color extraction product design from leftover flowers as prototype products, 3) the overall knowledge of virtual reality technology was at average of 4.40 and a standard deviation of 0.78 which made the study an appropriate average of 4.45 and a standard deviation of 0.63 and 4) the design of color extraction products obtained five commercial prototypes.

**Keywords;** *Big Data, Design, Virtual Reality, Innovative*

## I. INTRODUCTION

Recently, a large number of leftover flowers causes the environment impacts, odor and color pollution in local communities in Thailand. Technological processes and development has been rapidly involved. The idea of continually innovating towards cost reduction is to meet the sustainable commercial picture. At the same time, to create a new product that benefits the community in big cities, there should not be leftover flowers. Such factors have led researchers to identify opportunities and conceptual channels for integrating creative artistic design and technology.

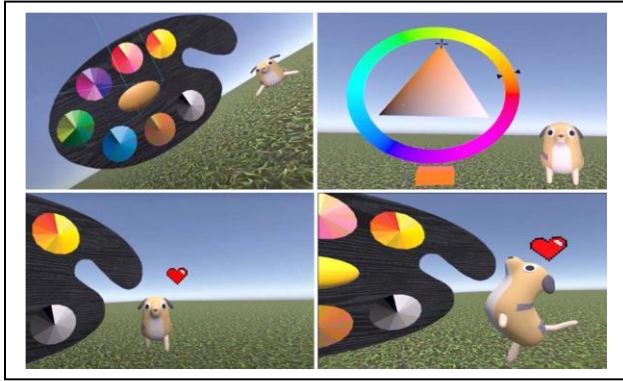
Therefore, the researchers came up with the idea of designing something new from the remnants of flowers into an integrated art and technology design process towards sustainable development for the future.

## II. LITERATURE REVIEW

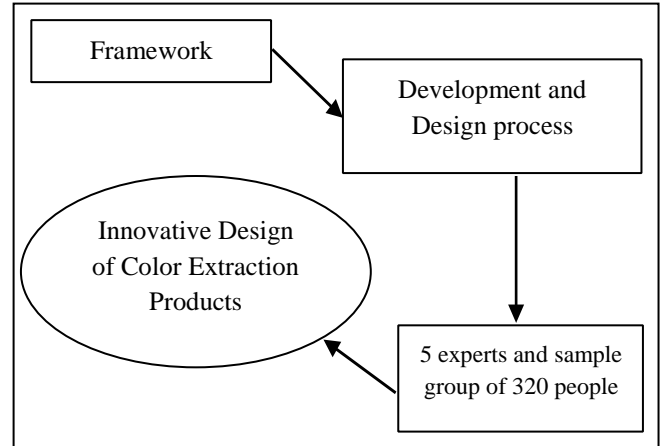
The process of images performing was computerized with digital core analysis to obtain qualitative and quantitative in the form of colors. *On the road and face detection* is the rapid process of development that the researchers have applied. Aekkarat S. (2022) [1] A system of analyzing the ripening of fruits with image processing technology. This enables faster and more accurate image processing for research.

Zhang, Y., Fan, Q., Bao, F., Liu, Y., & Zhang, C. (2018) [2] studied the topic entitled "Single-Image SuperResolution Based on Rational Fractal Interpolation" which aimed to present the process of creating a Super Resolution (SR). This led to processing by splitting the dimensions of the image in order to lead to higher resolution. In this research, the researcher used a new model of estimation technique for evaluating the properties of the image. The analysis results revealed the process of using the technique to create a pattern including the development of high-performance image creation algorithms.

M. Alex (2022) [3] studied in "Perceptions of Color Pickers and Companions in Virtual Reality". It is a research of the creation of virtual reality art that goes into digital to create impression in the form of interactions among different age groups using techniques of color choices in VR and its effects of friends in the virtual world. The results of an online survey of 63 adults and 24 seniors differed significantly in color choices in the perception of hedonic properties, with statistical differences found among adults' perceptions, elderly and their virtual friends showed no significant effect on the participants' overall experiences as shown in Figure 1.



**Figure 1:** Color Pickers and the Virtual Dog  
From the first row: Discrete picker with the dog sitting (left), HSV picker with the dog standing (right). [3]



**Figure 1:** Research Process

Sudjit B. & Praneetpolgrang P. (2018) [4] Research that uses the technique of image resolution by way of splitting images to achieve a quick download. This allowed the researchers to apply it to create 3D and Virtual Reality in the program.

Manogaran, G., Thota, C., & Lopez, D. (2022) [5] Analysis in an interactive way by collecting large data into a systematic process. This gives researchers a glimpse into the way they think, thus leading to further application to research.

### III. RESEARCH METHODOLOGY

#### A. Methods

The description of the research methodology including data collection are as follows;

The 1<sup>st</sup> stage: Conceptual framework for relevant domestic and international research

The 2<sup>nd</sup> stage: Development and design process

The 3<sup>rd</sup> stage: Process design development for teaching and learning

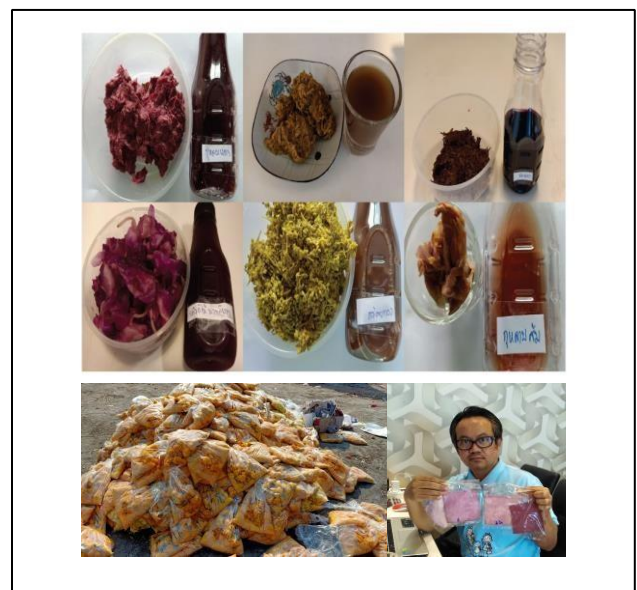
The 4<sup>th</sup> stage: Gathering information using questionnaires on prototype design and development

#### B. Population and Sampling Group

The sample consisted of 5 experts and another sample group of 320 as shown in Figure 1.



**Figure 2:** Color Extraction 1 - Soak the leftover flowers and ragged cloth in water. The proportion of flowers and water used in the study is 1:5. Observe the color changes during the process.



**Figure 3:** Color Extraction 2

Try to soak the leftover flowers with different types of ragged cloth and observe the colors.

**IV. RESULT AND DISCUSSION**

To find the mean and standard deviation of this study, the researcher used 5 methods of assessment using the respondents’ opinions as shown in the tables. [6]

TABLE I. CRITERIA FOR ASSESSMENT

Levels of Opinions	
Average Score Range	Satisfaction Level
4.50-5.00	Highest
3.50-4.49	High
2.50-3.49	Average
1.50-2.49	Low
1.00-1.49	Very Low



**Figure 4:** Color Extraction Products

TABLE II. FACTORS EFFECTING THE LEFTOVER FLOWERS

Factors Effecting the Leftover Flowers			
Assessment Items	Level of Opinions		
	$\bar{X}$	S.D.	Assessment Results
1. Color of flowers	4.45	0.70	High
2. Preparedness	4.42	0.69	High
3. Flower type	4.41	0.70	High
4. Price	4.46	0.65	High
5. Attribute	4.35	0.77	High
6. Shape	4.36	0.73	High
7. Size	4.45	0.68	High
8. Quantity	4.11	1.10	High



**Figure 4.1:** Color Extraction Products

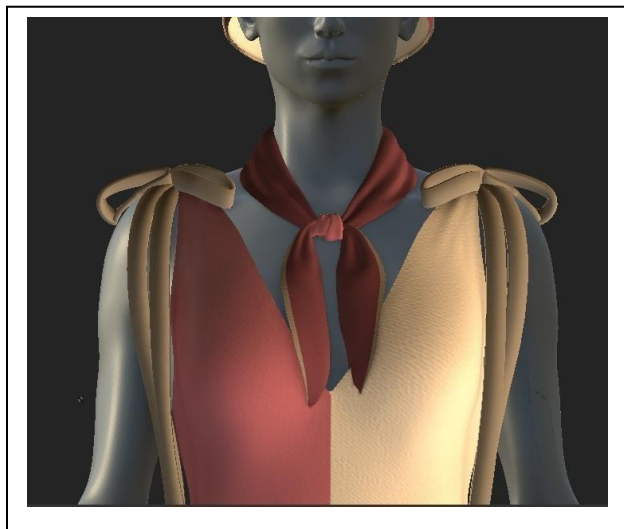
Table II shows the results of the mean and standard deviation analysis of the online questionnaire on the topic of “Innovative Design of Color Extraction Products from leftover Flowers Using Virtual Reality With Big Data” of each important issue from the relevant dimensions.

TABLE III. REAL-WORLD ENVIRONMENT SIMULATION WITH BIG DATA

Real-world Environment Simulation with Big Data			
Assessment Items	Level of Opinions		
	$\bar{X}$	S.D.	Assessment Results
9. Virtual reality	4.40	0.78	High
10. Cognitive generation	4.45	0.66	High
11. Suitability	4.45	0.63	High
12. Design	4.52	0.61	High
<b>Overall Average</b>	4.40	0.72	High

Figures 4 and 4.1, shows the results of the color extraction from the leftover flowers products which were used to create 5 commercial packaging prototypes and product design innovations using big data simulation of real-world environments that can actually be used commercially.

The results of creating knowledge in virtual reality technology at the level of an online laboratory VR process.



**Figure 5:** The knowledge of virtual reality technology was revealed at an overall average of 4.40 and a standard deviation of 0.78 which was an appropriate average of 4.45 and a standard deviation of 0.63 and five commercial prototypes obtained.

## V.CONCLUSION

The researchers also found that there was a wide variety of different leftovers collection in the local markets that could be processed and developed using creative thinking design of color extraction from leftover flowers and big data simulation of real-world environments. More creatively, the researcher has noticed that to develop a model and put into practice suitable for more valuable applications could be another interesting dimension. Moreover, the Application of the leftover flower color extraction innovation should be evaluated periodically for future improvements based on research findings as well as extending applications to other regions.

## ACKNOWLEDGEMENT

The success of this research, the Thailand Science Research and Innovation (TSRI) has provided the budget for the project entitled “Innovative Design of Color Extraction Products from Leftover Flowers Using Virtual Reality with Big Data” in favor of science research and innovation under the Basic Research Fund for fiscal year 2021.

The researchers would like to express my gratefulness to the President, administrators and all teachers of Rajamangala University of Technology Tawan-ok for all supports.

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