

A Research on Fun Design's Expressive Elements of Graphic Patterns in Cultural and Creative Products

SaiYou Li¹, YuBo Wang^{2*}

Abstract

In today's society, people's demand for products is no longer limited to meeting rigid demands but emphasizes spiritual and psychological pleasure and satisfaction in the products purchased. Fun design for cultural and creative products rises in response to the proper time and conditions. In the fun design of cultural and creative products, the design of graphic patterns will give people a more intuitive aesthetic feeling. However, there is insufficient research on the expressive elements of fun graphic patterns in cultural and creative products. The purpose of this research is to study the key elements and the artistic functions shown in different fun design types by analyzing them in relation to different expressive elements based on the many types of graphic patterns in fun design in cultural and creative products. This study investigates and examines the four fun design types, namely, direct use, cartoonisation, symbolic use, and use conversion of graphic patterns in cultural and creative products, in combination with the seven fun design expressive elements, including transformation, deviation, optical illusion, reversal, association, exaggeration, and implication. It concludes that all seven expressive elements of fun design are expressed to a certain extent in graphic pattern fun designs of cultural and creative products. However, these expressive elements show differences in their use according to different graphic pattern fun designs.

Keyword : Cultural and Creative Products, Graphics and Patterns, Fun Design, Expressive Elements

1.Introduction

1.1 Background and Purpose of Research

With the continuous development of the Internet and multiculturalism, people's demand for products has evolved beyond functionality and quality to emphasize the visual effect and emotional experience presented by the products. In product design, cultural and creative products are perceived as the medium of cultural inheritance and the achievement of the fusion of culture and technology. Cultural and creative products are closer to people's daily lives and stress the importance of form and aesthetics to meet people's spiritual needs while fulfilling functional demands. Many cultural and creative products

1 Department of Convergence Design, Hanseo University, Seosan, Korea [Ph.D. Candidate]

e-mail: saewoo@foxmail.com

2 Department of IT Design, Seoul National University of Science and Technology, Seoul, Korea [Ph.D. Candidate]

e-mail: urpowang@foxmail.com (Corresponding Author)

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only seek to satisfy people's emotional and aesthetic desires instead of focusing on functionality [1]. In addition, integrating contemporary cultural and creative products in the market has triggered the public's deep interest in traditional culture and stirred up a wave of attention. These products that highlight traditional and regional culture characteristics and stimulate cultural memory will attract consumers, trigger empathy, and stand out from the crowd with their unique cultural connotations [2]. These products meet people's spiritual needs and provide a means of adding value to products in the face of severe problems of technological homogeneity. Therefore, in-depth research on cultural and creative products has become essential to search for products that satisfy consumers' emotional experience and aesthetic needs and embody cultural communication.

With the instability of social development, modern people face increasing uneasiness and pressure, which has given rise to a psychological desire to escape reality. In this psychological phenomenon, the tendency to pursue 'Fun' rises continuously, and people become interested in simple and pleasant things, shifting from consumption for necessity to consumption for pleasure and fun [3]. American cognitive psychologist Donald A. Norman claimed in his book 'Emotional Design' that if using a product satisfies the user's need and brings pleasure simultaneously, it will quickly achieve the expected objective and generate warm and positive feelings [4]. Today's cultural and creative products have been designed to increase consumer demand through fun in terms of graphics, cultural content, materials, and experience.

Especially in cultural and creative products, designers can re-create the original classic graphic patterns through various free and diverse artistic expressions and apply innovative thinking to re-interpret the traditional culture into works complete with modernity and fashionable elements. This innovation frees people from inherent stereotypes and familiar perceptions and delivers cultural and creative products that are fresh and interesting. The fun design of graphic patterns in cultural and creative products is divided into four types: direct use of graphic patterns, cartoonisation of graphic patterns, symbolic use of graphic patterns, and use conversion of graphic patterns. Outstanding graphic patterns often attract attention and become an essential medium for conveying product information and stimulating consumer desire [5]. Graphic patterns will give people more direct visual details to intuitively feel the commodity or cultural content visually. Therefore, graphic patterns become a powerful communication medium in this process.

The purpose of this study is to take the four types of graphic pattern fun designs in cultural and creative products as the benchmark and, through the analysis combined with the seven fun design expressive elements, to study the key elements used in the different types of graphic pattern fun designs and the artistic functions shown, to provide a theoretical basis for the future research related to the fun

designs of graphic patterns in cultural and creative products.

1.2 Research Method and Scope

The methodology of this study is first to collect cases of fun design on graphic patterns in cultural and creative products and then combine the seven expressive elements through a Likert 7-point scale for a questionnaire survey and analysis. At the end, a summary of commonalities and differences in the use of expressive elements between different types of fun design of graphic patterns will be provided. The scope of this study is four types of graphic pattern fun designs in cultural and creative products. The case studies related to cultural and creative products in this research do not involve specific types of cultural and creative products.

2. Theoretical Analysis

2.1 Definition of Cultural and Creative Products

Creative economy theorist Richard E. Caves believes that creative economy provides broad, cultural, artistic, or merely entertaining goods and services linked to value. Creative products, in turn, are the primary source and approaches by which individuals enjoy the core value of the creative economy [1]. Cultural and creative products are the products of the mutual integration of culture and technology, which also serve as the media of cultural inheritance in industrial design [6]. Each cultural and creative product has a unique personality, presenting different appearances and performances depending on the expected users and target customers [4]. From the perspective of materiality, cultural and creative products have a dual nature of materiality and spirituality, paying attention to factors such as craftsmanship and materials while taking into account the existence of emotional, storytelling, and aesthetic qualities at the spiritual level [7]. Nowadays, cultural and creative products are mainly divided into three categories: creative home life, cultural and creative products; tourism cultural and creative products with regional characteristics, such as those of museums and memorial halls; and content peripheral derivatives, such as those of comics and movies [8]. These products not only require to have aesthetic and functionality but also need to carry deep cultural connotations. Therefore, cultural and creative products are one of the most critical approaches to achieving cultural innovation and dissemination.

2.2 Definition of fun design

First, fun is the aesthetic feeling that makes people feel pleasant, curious, and attracted. As one of the elements of artistic aesthetics, fun embodies people's pursuit and aspiration for beauty. Because the subject of fun is human, fun can be seen as an emotional need that is highly subjective, but fun design can be defined relatively objectively [9]. Because the target of fun design is people, they are the carriers of emotion, and where there are people, there is an expression of emotion. Secondly, fun design is a kind of artistic expression through various creative means and forms, which is usually presented in a perverse, peculiar, but reasonable way. Fun design attracts users and stimulates their inner resonance to obtain a sense of pleasure [10]. Fun design usually attaches 'extraordinary' plots to 'ordinary' products so that the products can "freely assume a wide range of cultural connections and illusions" [9]. Finally, fun in cultural and creative products indicates that the product has the quality of being interesting and full of human touch that attracts the audience [10]. Fascinating cultural and creative products have a higher potential to meet individuals' consumption and spiritual needs. This study will focus on the fun design expressive elements of graphic patterns in cultural and creative products.

2.3 Fun design types of graphic patterns in cultural and creative products

[Table 1] Four types of graphic pattern fun design in cultural and creative products

Direct use of graphic patterns	Cartoonisation of graphic patterns	Symbolic use of graphic patterns	Use conversion of graphic patterns
In the design field, using shapes, images, graphics, and patterns directly from traditional artifacts is a common and traditional approach. Even though this practice may face several challenges in innovation, it still has a lot of potential for creativity and development.	Cartoonisation is a commonly used technique in the design of cultural and creative products. The product image is endowed with vivid, lovely, and affinity characteristics through harmonizing graphic patterns. This design technique can increase consumer satisfaction, improve product acceptability, and create a more pleasant atmosphere.	The symbol is an indication that can refer to something, which can be the carrier of meaning and convey deep cultural, emotional, or ideological connotations. The symbolic use of graphic patterns can remind the user of a specific cultural background, highlight cultural and regional characteristics, or produce a symbolic meaning.	Use conversion of graphic patterns is substituting a fixed use of a graphic for another unexpected use. This technique allows users to re-examine the function and use of an object, creating a sense of novelty in a familiar product and bringing a sense of excitement and joy.

Graphics are crucial elements in design to increase users' attention [11]. In the design of cultural and creative products, graphic patterns can convey information directly through simple images. Specific graphics and patterns can resonate with people and stimulate associations in the commercial and cultural fields. Wei. Zhang found in the research that the methods of fun design for cultural and creative products can be summarised into four aspects: fun design of graphic patterns, fun design of product use, fun design of traditional allusions, and fun design of material craftsmanship. [Table 1] shows the four types of graphic pattern fun design in detail. Among them, the fun design of graphic patterns can be divided into four types: direct use, symbolic use, cartoonisation, and use conversion [10].

2.4 Classification of fun design's expressive elements

Kyung-Eun. Do claimed five expressive types of fun design: Character, Kidult, Irony, Storytelling, and Play. The sub-concepts are shown in [Table 2], covering seven expressive elements: transformation, deviation, optical illusion, reversal, association, exaggeration, and implication [12]. This study focuses on the performance of the seven expressive elements in the four graphic pattern fun design types in cultural and creative products.

[Table 2] Classification of fun design expressive elements

Classification	Expressive elements
Transformation	The form in which an existing thing is changed according to intention
Deviation	Deviation from the designated area or original purpose
Optical illusion	The illusion of difference from reality
Reversal	Unforeseen circumstances
Association	Phenomenon of one idea giving rise to another
Exaggeration	Give a more exaggerated picture of what things look like, size, features, etc. than they actually are
Implication	Carry multiple meanings

3. Empirical study

3.1 Experimental process






This study first collected design cases on four types of graphic patterns of fun design: direct use, cartoonisation, symbolic use, and use conversion. All design cases are from famous worldwide museums and art galleries, such as the British Museum in the UK, the Palace Museum in China, and the

National Central Museum in South Korea. Then, a 7-point Likert scale was conducted on the four types of design cases. Since the definition of the seven expressive elements is highly technical, twenty experts in cultural and creative product design, product design, and visual design were selected as the target respondents. Afterward, t-tests and comparative analyses were conducted on the results of the four types of research.

3.2 Case study of fun design of graphic patterns in cultural and creative products

3.2.1 Direct use of graphic patterns

[Table 3] Examples of direct use of graphic patterns

Example	Introduction
	In the British Museum, there is a pair of earrings designed from coins recovered from Burma that are no longer in circulation. The earrings show a creative new look through later processing that combines pearls with the coins.
	In the National Art Center of Japan, there is a reproduction of 'Tiger Stone' from 'The Fifty-three Stations of the Tōkaidō,' a masterpiece by the mid-19th century ukiyo-e artist Utagawa Yoshikazu. By combining modern craftsmanship with traditional culture, the designer promoted and spread the mystery and curiosity of Japanese culture in the form of cultural and creative products.
	In the design of the pastry series of the Forbidden City of China, one group of pastries features a part of the 'Huanghuali Lady's Treasure Scroll' from the Palace's collection. This design allows people to savor the pastry while taking a journey back in time to the ancient and glittering court era.
	In designing the masks in China's Dunhuang cultural and creative products, designers skilfully combined the historical and exquisite art of Dunhuang mural art with modern protection needs to create a new form of product that blends culture and functionality.
	The British Museum's stationery collection has a pencil sharpener shaped like an ancient Egyptian pyramid. The designer incorporated the mystery and majesty of the ancient Egyptian pyramids into everyday stationery items.

[Table 3] demonstrates five examples of the direct use of graphic patterns. The results of analyzing the cases of direct use of graphic patterns by one-sample t-test are shown in [Table 4]. From the analysis results, the $p < 0.05$ for association and transformation is significant, and the mean value is significantly higher than the median value of 4.0, leading two expressive elements to high performance and frequent utilization in the direct use of graphic patterns. The mean value of optical illusion is lower than the median of 4.0, so the element of optical illusion has the lowest performance in the direct use

of graphic patterns. Although there is no clear significance for expressive elements of transformation, deviation, reversal, and exaggeration, the mean is higher than or equal to the median of 4.0, so these four expressive elements have a specific performance in the direct use of graphic patterns.


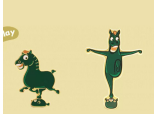



[Table 4] One sample t-test analysis of direct use of graphic patterns

Items	Mean	Std. Deviation	t	p
Transformation	4.000	1.622	0.000	1.000
Deviation	4.500	1.732	1.291	0.212
Optical illusion	3.550	1.538	-1.308	0.206
Reversal	4.600	1.698	1.580	0.131
Association	5.200	1.436	3.736	0.001**
Exaggeration	4.350	1.843	0.849	0.406
Implication	5.100	1.586	3.101	0.006**

* $p < 0.05$ ** $p < 0.01$

3.2.2 Cartoonisation of graphic patterns

[Table 5] Examples of cartoonisation of graphic patterns

Example	Introduction
	For the Playmobil toy series at the National Museum of Amsterdam, designers took artworks like Zelfportret Van Gogh and gave them a more adorable and grounded image through cartoonised characters, bringing the artwork closer to everyday life.
	In the badge products of the Gansu Provincial Museum in China, designers took the bronze artifact 'Flying Horse of Gansu' from the historical relics as the creative inspiration and gave the horse and swallow exaggerated expressions and movements through cartoonish artistic expression.
	Among the cultural and creative products in the National Library of China, there is a neck pillow made by extracting the element 'green onion' from the illustrations of the medical book 'Food Materia Medica.' The cartoonish design of this green onion-shaped neck pillow gives a vivid expression to the vegetable, injecting vitality into this inanimate ingredient.
	In the badge series launched by China's Shanghai Animation Film Studio, designers used the Chinese mythological god Erlang Shen and Howling Celestial Dog as source material and made Erlang Shen appear in a fashionable outfit through cartoonish character design techniques, making him look more relevant to contemporary life.
	In cultural and creative products to promote the culture of Confucius, designers used cartoonish techniques to depict Confucius as a kind and amiable older adult with a big white beard and holding flowers, presenting an intimate, approachable image.

[Table 5] displays five examples of cartoonisation of graphic patterns. The results of analyzing the

case of cartoonisation of graphic patterns by one-sample t-test are shown in [Table 6]. From the analysis results, the $p < 0.05$ of transformation, association, and exaggeration present significance, and the mean is significantly higher than the median of 4.0, so these three expressive elements have high performance and importance in the cartoonised use of graphic patterns. Although the $p < 0.05$ of deviation, optical illusion, reversal, and implication are not significant, the mean value is higher than the median value of 4.0, so these four expressive elements have a specific performance in the cartoonisation of graphic patterns.





[Table 6] One sample t-test analysis of cartoonisation of graphic patterns

Items	Mean	Std. Deviation	t	p
Transformation	5	1.487	3.008	0.007**
Deviation	4.05	1.791	0.125	0.902
Optical illusion	4.05	1.791	0.125	0.902
Reversal	4.3	1.625	0.825	0.419
Association	5.6	0.995	7.193	0.000**
Exaggeration	5.4	1.314	4.765	0.000**
Implication	4.45	1.572	1.28	0.216

* $p < 0.05$ ** $p < 0.01$

3.2.3 Symbolic use of graphic patterns

[Table 7] Example of symbolic use of graphic patterns

Example	Introduction
	In the National Museum of Korea, there is a pencil holder in the form of a Korean character, and when a pencil is put in it, a sound that sounds like the character is pronounced. This symbolic pen holder design presents a product that combines visual, auditory, and usage functions.
	In the Egyptian cat artifact at the British Museum in the UK, the designer extracted the symbolic shape of the Egyptian cat to make an artifact. The golden sequins in the glass ball symbolize the golden desert, and the rolling and falling golden sequins seem to reproduce the ancient Egyptian landscape surrounded by the desert in history.
	Among the cultural and creative products for sale at the Palace Museum is a set of tableware and wine utensils assembled in the image of a gourd. Gourds have many beautiful meanings in China, representing good luck, wealth, and happiness. The design of such a set of dining and drinking utensils makes people feel the blessing of traditional culture in dining.
	Symbolic designs of ancient Egyptian hieroglyphics appear in the British Museum's stationery range, which offers visitors a way to interact with ancient Egyptian culture. For example, the product's official description is "Learn how to write your name or send a message using ancient symbols."



The cultural and creative product of the Taipei National Palace Museum, 'the Tang Dynasty Falling Horse Bun Neck Pillow,' symbolically refines the hairstyle pattern of the Tang Dynasty maid's falling horse bun. The pillow can be placed on the neck as a U-shaped pillow to rest and protect the neck. The pillow can instantly transform the user into a Tang Dynasty lady if worn directly on the head.

[Table 7] illustrates five examples of symbolic use of graphic patterns. The results of analyzing the case of the symbolic use of graphic patterns by one-sample t-test are shown in [Table 8]. From the analysis results, the $p < 0.05$ for transformation, association, and implication presents significance, and the mean is significantly higher than the median of 4.0, so these three expressive elements have high performance and utilization frequency in the symbolic use of graphic patterns. In addition, although deviation, optical illusion, reversal, and exaggeration show no obvious significance in the symbolic use of graphic patterns, the mean value is higher than or equal to the median of 4.0, so these four expressive elements have a particular expression in the symbolic use of graphic patterns.



[Table 8] One sample t-test analysis of symbolic use of graphic patterns


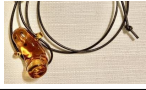
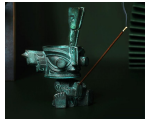
Items	Mean	Std. Deviation	t	p
Transformation	5.15	1.309	3.929	0.001**
Deviation	4.35	1.843	0.849	0.406
Optical illusion	4	1.806	0	1
Reversal	4.5	1.433	1.561	0.135
Association	5.45	1.395	4.65	0.000**
Exaggeration	4.6	1.635	1.641	0.117
Implication	5.35	1.565	3.857	0.001**

* $p < 0.05$ ** $p < 0.01$

3.2.4 Conversion of the use of graphic patterns

[Table 9] Examples of use conversion of graphic patterns

Example	Introduction
	The design of the Tape Divider from the National Central Museum of Korea's stationery collection skilfully incorporates the shape of cassette tapes from the past into the design of modern stationery. The tape inside replaces the original cassette tape, providing users with a nostalgic and novel experience simultaneously.
	In the collection of tea sets from the Palace Museum, there is a set of tea sets designed with elements such as bridge buildings, palanquins, baskets, and boats carried by the people in the masterpiece 'Along the River During the Qingming Festival.' This design creates cultural and creative products that are both artistic and practical.

	In the lamp series of the National Library of China's cultural products, a night light is designed with the book 'Classic of Mountains and Seas' as an element. The design of this night light retains the paper texture of the book and the book's opening and closing design, which can be unfolded 360 degrees, adding flexibility to the use of the lamp.
	In a necklace collection sold at the National Museum of Tokyo, the designer designed the hands of a 6th-century sculpture of a ceramic man to grasp a rope as if he were swinging, injecting a lively and playful modern interpretation of an ancient artifact.
	The Chinese CCTV channel 'National Treasure' program launched a series of cultural and creative products, such as incense sticks. The designer extracted elements from the bronze masks unearthed in Sanxingdui, preserved the texture and pattern of the bronze masks, and transformed them into incense sticks, adding practicality to the cultural and creative products.

[Table 9] summarizes examples of the use conversion of graphic patterns. The results of analyzing the case of use conversion of graphic patterns by one-sample t-test are shown in [Table 10]. From the analysis results, the $p < 0.05$ for association and implication presents significance, and the mean is significantly higher than the median of 4.0, so these two expressive elements of association and optical illusion have a high performance and utilization frequency in the use conversion of graphic patterns. The mean value of exaggeration is lower than the median of 4.0, so this expressive element has the most deficient performance in the use conversion of graphic patterns. Although there is no apparent significance in the use conversion for four expressive elements, including transformation, deviation, optical illusion, and reversal, the mean values are all higher than the median of 4.0, so these four expressive elements are all represented.

[Table 10] One sample t-test analysis of use conversion of graphic patterns

Items	Mean	Std. Deviation	t	p
Transformation	4.6	1.465	1.831	0.083
Deviation	4.8	1.735	2.062	0.053
Optical illusion	4.3	1.809	0.742	0.467
Reversal	4.55	1.504	1.636	0.118
Association	5.05	0.945	4.972	0.000**
Exaggeration	3.95	1.504	-0.149	0.883
Implication	5.05	1.761	2.666	0.015*

* $p < 0.05$ ** $p < 0.01$

4. Results

4.1 Comparative analysis of graphic pattern fun design types in cultural and creative products

The comparative analysis of the survey results on the four types of graphic pattern fun design in

cultural and creative products is shown in [Fig. 1]. Associations appear to have high performance and importance in all four categories: cartoonisation, symbolic use, direct use, and use conversion, with the highest performance in cartoonisation. Implication is frequently used in direct use, symbolic use, and use conversion but performs less in cartoonisation. Exaggeration showed the highest performance in cartoonisation and the lowest in use conversion. Optical illusion has the lowest performance in the direct use of graphic patterns. Transformation has the highest performance in symbolic use and the lowest in the direct use of graphic patterns. Deviation has the highest performance in symbolic use and the lowest in the direct use of graphic patterns. Deviation and reversal are represented in all four use types, but the performance is not apparent.



[Fig. 1] Comparative analysis of graphic pattern fun design types in cultural and creative products

4.2 Comprehensive Analysis

The results of this study's analysis of the expressive elements of fun design of graphic patterns in cultural and creative products are shown in [Table 11]. First, although seven elements are all expressed in the fun design of graphic patterns in cultural and creative products, four elements have higher performance and frequency of utilization: association, implication, transformation, and exaggeration. Hence, these four expressive elements have a more significant influence on the fun design of cultural and creative products. Secondly, the expression of association and implication highlights a higher position in the study. In the use of association, designers usually relate the graphic patterns to the

historical background, personal feelings of the users, and contents and scenes of the culture. In the use of implication, the pattern is given more layers of connotation and meaning through symbolism and metaphor. The high performance of these two elements shows that emphasizing emotional resonance and rich symbolism is essential in the graphic pattern design of cultural and creative products. In addition, transformation and exaggeration also received attention for graphic pattern fun design in cultural and creative products. By adjusting shapes and proportions and exaggerating the elements' features, movements, or expressions, designers can make patterns more lively and interesting. This shows that transformation and exaggeration are potent tools for pursuing unique modeling and visually fresh designs.

[Table 11] The main expressive elements of graphic pattern fun design in cultural and creative products

	Transformation	Deviation	Optical illusion	Reversal	Association	Exaggeration	Implication
Direct use					●		●
Cartoonisation	●				●	●	
Symbolic use	●				●		●
Use conversion					●		●

5. Conclusion

This study draws the following conclusions by analyzing the four types and the seven expressive elements of graphic pattern fun design in cultural and creative products.

Firstly, in the direct use of graphic patterns, designers mainly use association and implication as primary expressive elements. This design shows the mysterious nature of traditional art and enhances the user's sense of historical civilisation. It also stimulates the imagination to create products that blend classic elements with the needs of modern society. However, designers should also strengthen their use of reversal as an expressive element. According to the case study and survey results, when graphic patterns in traditional art are removed from their original cultural context and recombined with other unrelated elements, they often give people unexpected and incredible visual aesthetic sensations. By exploring this reversal, designers have the opportunity to give graphic pattern design a broader scope of expression.

Secondly, in the cartoonisation design of graphic patterns, designers mainly use three expressive elements: transformation, association, and exaggeration. This design gives the traditional classic characters a cute, grounded, cartoonish image that is closer to contemporary life and gives a sense of visual freshness to people. In addition, this design has a positive effect on people's life stress and low mood.

This design concept injects more lively and exciting ideas into the cultural and creative industries.

Besides, in the symbolic design of the graphic pattern, designers mainly used transformation, association, and implication as key expressive elements. This design creates a series of products that incorporate multi-sensory experiences, highlighting the diversity and innovation of the design. Additionally, the designers stimulate the associative space by cleverly linking different elements together so that the symbol is no longer a simple graphic but a medium of expression rich in multi-layered meanings. Such products promote the interactivity between people and traditional culture.

Finally, in the design of the graphic pattern's use conversion, designers mainly use two expressive elements, including association and implication, to create products that combine nostalgia and novelty. This design enhances the flexibility and functionality of the products, making them more relevant to users' needs and becoming interesting products that are fashionable, practical, and personalized. However, designers should strengthen the importance of deviation as an expressive element. According to the case study and survey results, using transformation deviates from the original element from the designated field and original purpose and presents a different type and period. By exploring this expressive element of deviation, designers can create cultural and creative products with new cultural connotations while maintaining their original core characteristics.

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