THE STUDY OF CROSS-CULTURAL GRAPHIC DESIGN: THE ROLE OF GRID-BASED TECHNIQUES IN INTEGRATING CHINESE AND THAI PATTERNS

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ABSTRACT
This study applied graphic design principles to blend Chinese elements with the traditional Thai pattern, Pha Lai Yang. Using grid-based analysis, it reviewed historical and contemporary patterns from both cultures, emphasizing their visual and cultural significance. A grid system was used to organize and deconstruct the patterns, while vector graphics software aided in extracting and recombining elements. The final hybrid designs were showcased on product mockups through digital prototyping. Design experts evaluated the patterns, confirming their cultural authenticity and commercial appeal. This research highlighted the role of graphic design in cross-cultural visual synthesis, offering innovative methods for pattern creation. Compared to previous studies focused on direct pattern adaptation, this research emphasized the role of graphic design methodology in cultural fusion. The use of grid systems and digital tools for pattern analysis and creation represented an innovative approach in this field.
The outcome demonstrated the effectiveness of graphic design in bridging cultural aesthetics, resulting in versatile patterns applicable to diverse product designs. This research contributed to the graphic design field by offering new perspectives on cross-cultural visual synthesis and pattern creation methodologies.
Keywords: Cross-Cultural, Graphic Design, Grid-Based Techniques, Pattern Integration, Visual Communication

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INTRODUCTION

Graphic design is complex combinations of words and pictures, numbers and charts, photographs and illustrations that, in order to succeed, demands the clear thinking of a particularly thoughtful individual who can orchestrate these elements, so they all add up to something distinctive, or useful, or playful, or surprising, or subversive or somehow memorable (Newark, 2002). The grid plays a key role in balancing and fusing diverse motifs into a cohesive whole.

The typographic grid is an organizing principle in graphic design. The assumption of this system is that placement. And scale relationships between informational elements-whether words or images-help an audience understand their meaning (Samara, 2017). In cross-cultural design, People with different cultural backgrounds think and behave differently. Designing user interfaces and products for different cultures also affects human factors design methodology (Plocher et al., 2021). The grid system plays a pivotal role, as cultural patterns, particularly in textiles, can be analyzed and adapted using grid-based methods. Both Chinese and Thai designs, for example, often feature symmetrical, repeated, and rotated motifs, which fit seamlessly into grid-based layouts. Thai Elephant Pants, a cultural product, exemplify this technique by showcasing symmetrical, repetitive patterns that can be analyzed and adapted using the grid system. Thai Elephant Pants" are lightweight and billowy pants with various elephant designs and patterns, which have exploded in popularity among foreign tourists. They play an essential role in promoting Thailand's soft power (Nation Thailand, 2024). This grid-based adaptation allows for the creation of culturally resonant, modern designs while preserving traditional aesthetics.

Figure 1 Thai elephant pants
Source: Photographed in a shop near the Grand Palais (2024)

Since ancient times, Chinese culture has a long history of spreading to the outside world, and the cultural exchanges between China and Thailand also have a very long history (Wang & Su, 2024), and their graphic design is deeply rooted in their respective historical and cultural traditions and technological development, which jointly shape the differences and characteristics of China and Thailand in graphic design.

Ancient Chinese graphic design dates back over 5,000 years. The history of Chinese graphic design can be understood more meaningfully as encompassing the whole region rather than as a set of discrete local histories (Wong, 2001). It developed with changing dynasties, blending artistry with harmony and unity, which laid the foundation for China's traditional grid system. Influenced by Confucianism, Taoism, and Buddhism, traditional Chinese design emphasizes nature's harmony and balance. Additionally, Chinese painting, which focuses online beauty and dynamic space, has significantly shaped the evolution of the Chinese grid system. After thousands of years of development, traditional Chinese culture and art have accumulated profound heritage (Wu, 2019).

Figure 2 Traditional Chinese fabric pattern
Source: Book from "A History of Chinese Patterns"

For flat patterns in Thailand, this article focuses on Pha Lai Yang. Pha Lai Yang is a traditional Thai print pattern, and in the 16th century, due to the booming development of Indian prints at that time, Thailand's production technology was not capable of making its own. The patterned prints that Thailand sends its own designs to India are called Pha Lai Yang. Pha Lai Yang is well suited to the use of grids for analysis and design. It has a strict sense of structure and order, showing early graphic and typographic design and early use of grids. This allows Pha Lai Yang to place more emphasis on logic, clarity and functionality. This paper will uses grid systems and digital tools for pattern creation and analysis of Chinese and Thai patterns, providing a new vision for pattern creation in the field of graphic design.

Figure 3 Thai print Pha Lai Yang
Source: National Gallery of Australia

Thailand is known for its rich textile tradition and there are many fine textile souvenirs to choose from. Pha lai yang is an Indian fabric whose pattern sample was designed by Siam as requested by the Siamese. The pattern sample was then sent to India where the fabric was printed as per the Siamese's order and then sent back to Siam (Konidala, 2023).
The fabrics come in a variety of patterns, often including geometric shapes, flowers, or other traditional decorative designs. Chint or chintz was also known as calico, the word being derived from Calicut in India whence came the first supplies of chintz (White, 1960). Each design may reflect the culture and customs of a different region of Thailand. The fabric can be used to make a variety of traditional clothing, home decorations and souvenirs. For example, traditional Thai clothing (such as skirts, scarves) as well as decorative fabrics (such as tablecloths, cushions) may use this fabric. Table 1 shows the application of Pha Lai Yang in various products

Table 1 Product application of Pha Lai Yang

Applied to clothing			
Applied to daily products			

China was also a reaction in the design of textile patterns such as clothing. The author selected the clothing textile patterns of Ming and Qing Dynasties in China in the same period as Pha Lai Yang. Although the sample size is limited, its representativeness and diversity provide an important opportunity for this study to deeply explore the characteristics and objective regularity patterns of Chinese and Thai planar patterns. Through the in-depth analysis of these limited samples, we can better understand the rich changes of graphic design and reveal its regularity and characteristics.

Figure 4 Qing Dynasty clothing textile patterns
Source: The Palace Museum (1934)

LITERATURE REVIEWS

The grid system was a design tool widely used in graphic design, which helped designers organize and arrange visual elements through ordered grid lines, making the design more structural and logical. With the advancement of globalization, cross-cultural design gradually became an important direction in modern design. The textile pattern designs of China and Thailand, representing their respective cultures, contained rich historical and cultural connotations. This paper discusses the application of the grid system in graphic design, particularly how visual elements from different cultural backgrounds were coordinated in cross-cultural design, and analyzes its specific performance and influence in Chinese and Thai textile pattern designs.

The literature reviewed in this paper came from Google Scholar, JSTOR, and other databases, with search keywords including "grid system," "graphic design," "cross-cultural design," "Chinese textile pattern," "Thai textile pattern," "cross-cultural visual communication," and

similar terms. The selection criteria for the literature were closely related to the grid system and its application in cross-cultural design, especially studies of textile pattern design in China and Thailand.

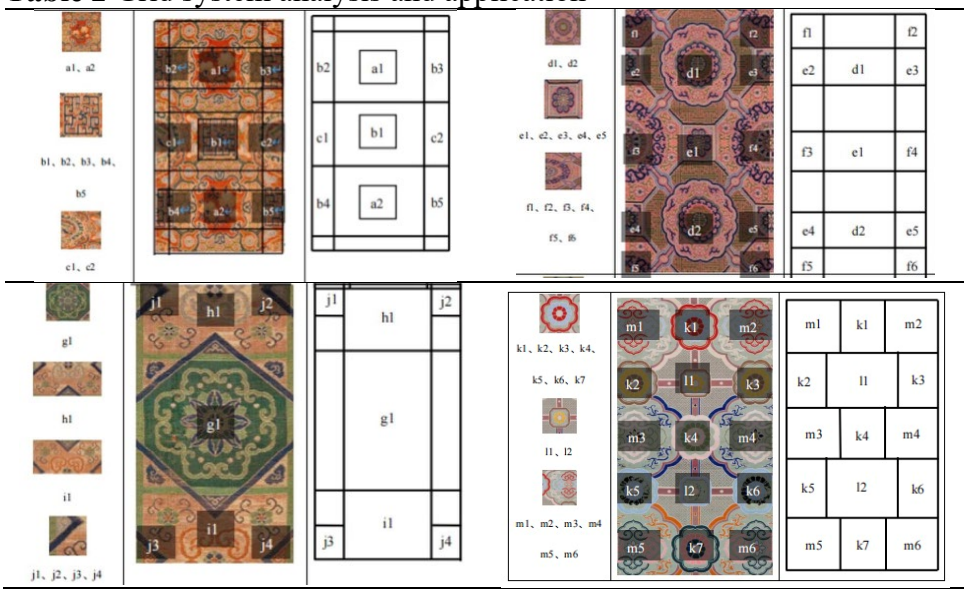
RESEARCH METHODOLOGY

In design research, grid systems were important tools for building visual structures and organizing information. By using grid systems, designers were able to flexibly manage complex patterns and cultural symbols while maintaining aesthetic unity. In cross-cultural design, especially textile pattern design in China and Thailand, grid systems not only provided a framework for integrating traditional elements but also enhanced the creativity and efficiency of the design through digital tools. This chapter introduced methods for grid system analysis, sample selection criteria, and tools and techniques for digital pattern creation.

RESEARCH RESULTS

In the study of Chinese and Thai patterns, cell sizes were determined based both on actual measurements of existing samples and on professional design specifications. Their size may have been influenced by ancient skill levels, layout requirements, and documentation. Specifically, the grid system consisted of column lines and row lines, which were constrained by columns in the grid. In this study, each cell was defined as a unit, and the dominant column and row lines between elements in the sample were set as standards, as shown in Table 2. Here, the grid formed by the columns served as a framework for the layout, which was used to standardize the size of the pattern elements, locate the image position, balance the scale of the layout elements, and ensure overall visual coordination.

Table 2 Grid system analysis and application



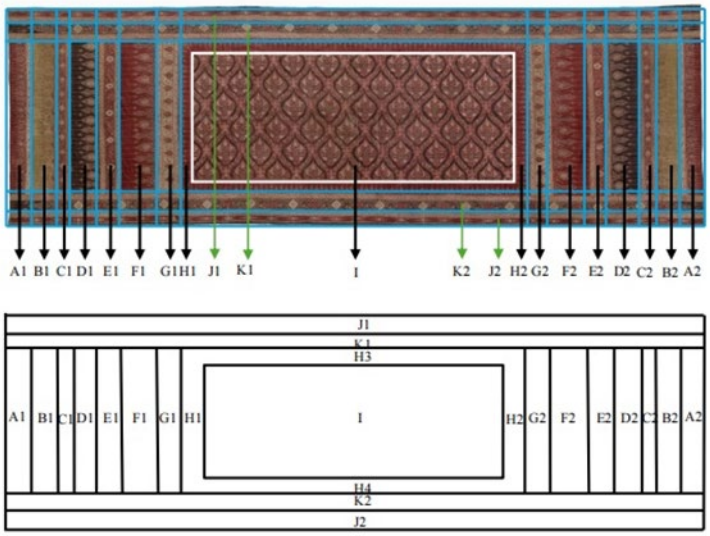
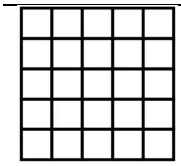
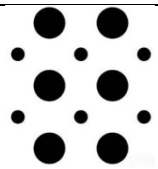
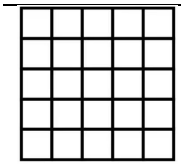
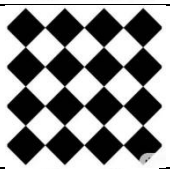
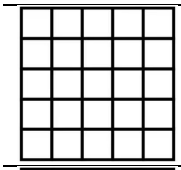
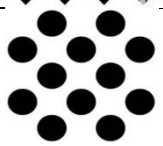
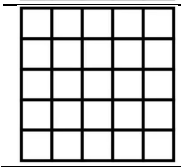
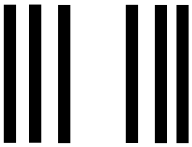


Figure 5 Pha Lai Yang grid division

As for the Chinese pattern and Pha Lai Yang, grid analysis found many similarities. Their structures were simple, clear, and very orderly. Regarding the differences, each square in the Chinese pattern, which made up the grid, was treated as an individual element, with changes in its shape and filling to create a sense of variety and freshness. When these squares were stacked together, a richer pattern was created. Table 3 showed some examples of the system. The main methods involved two-dimensional composition and three-dimensional superposition. The structural system of Pha Lai Yang was more inclined to combine horizontal and vertical lines, resulting in symmetry throughout the overall pattern. This contrasted with the variety of structural elements found in the Chinese pattern.

Table 3 Pattern evolution process

Grid line	Pattern extraction	Pattern
		
		
		
		

According to the results of the questionnaire survey, most people wanted to apply the pattern to the scarf, so the subsequent designers used the silk scarf as the medium.

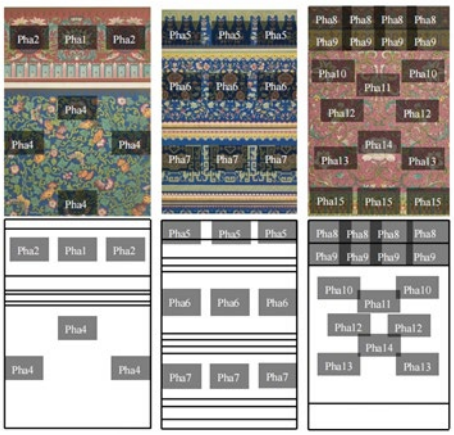


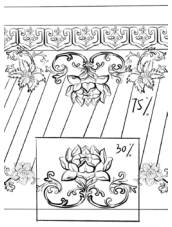
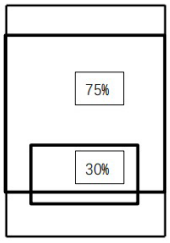
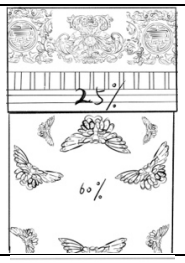
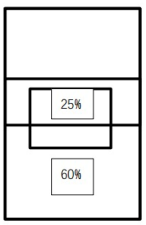
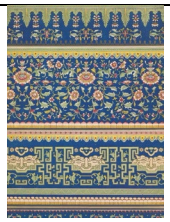
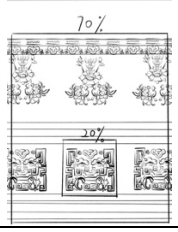
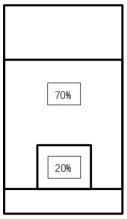
Figure 6 Design pattern grid analysis

Based on a grid system, digital tools and technology were used to create and design patterns.

Figure 7 Design pattern grid analysis

Using the grid system to analyze the design pattern, each part of the pattern was found to be suitable for application in different products, and the proportion of each part determined the beauty of the product.

Table 4 Graphic design application

DISCUSSION & CONCLUSION

It was found that the mesh system played a key role in the fusion of textile patterns in China and Thailand. The grid structure provided balance and harmony in pattern design, especially in the coordination of symmetry and proportion. Digital design tools, such as Adobe Illustrator, improved the accuracy and efficiency of pattern creation, helping designers to easily achieve symmetry and modular processing of complex patterns.

This study revealed the important role of the grid system in the fusion of Chinese and Thai cultural patterns, particularly in the application of digital tools. The research contributions included providing effective methods for achieving visual balance in cross-cultural design and showing how digital tools could improve design efficiency and precision. The application of the grid system in cross-cultural design was expanded.

The article first introduced the definition and principles of graphic design and highlighted its necessity in daily life. Secondly, it explained the importance of the grid in graphic design and emphasized the grid system. Then, the visual features of Chinese and Thai patterns were selected through the results of a questionnaire, and the role of graphic design methodology in cultural integration was emphasized. Finally, innovative design was carried out. Pattern analysis using grid systems and digital tools was an innovative approach that provided a new perspective on the field of graphic design.

Future research could further explore the use of grid systems in other cultural contexts, as well as their potential in virtual reality and dynamic design. At the same time, the combination of more digital tools will provide designers with more innovative design approaches and promote the in-depth development of cross-cultural visual communication.

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