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Analyze the Guidelines for Writing Research Approach on Graphic Design Methods using Visual Illusion Art.

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Abstract

Background and Aim: Visual illusion art offers unique, innovative value in graphic design, enabling designers to break conventional thinking patterns and enhance the expressiveness and appeal of their work. However, there is a lack of systematic and practical guidance for applying visual illusion techniques in design. To address this gap, this study systematically summarizes the application methods of visual illusion in graphic design, culminating in the book Research on Graphic Design Methods Based on Visual Illusion Art. Unlike existing studies focused on theoretical discussions, this book integrates theoretical foundations with methodological frameworks and practical applications, aiming to help designers master visual illusion principles and enhance the innovation, expressiveness, and visual impact of their work.

Materials and Methods: A mixed-methods approach was adopted, combining qualitative methods (literature review, field investigation, case studies, and interviews) with quantitative analysis (surveys and statistical evaluation of the book's effectiveness). This approach ensures both theoretical depth and practical relevance in exploring the application of visual illusion in graphic design.

Results: Key findings include: (1) Visual illusion-based design methods are classified into five categories: geometric, color, motion, spatial, and multi-meaning figure illusions. (2) Visual illusion art helps designers overcome traditional design limitations, fostering creativity and expressive potential. (3) The book provides designers and students with structured methodologies and creative inspiration, improving their design skills, originality, and visual appeal.

Conclusion: This study enriches design methodologies by proposing a classification system and application methods for visual illusion, offering designers systematic tools to expand their creative thinking and enhance the expressiveness of their work. Additionally, the study contributes to design education by providing new teaching resources that help students gain a deeper understanding of visual illusion techniques, thereby improving their practical and innovative capabilities.

Keywords: Visual Illusion Art; Graphic Design Methods; Book Design

Introduction

We live in a visually driven era, where images dominate our daily lives from morning to night. Due to their intuitive, concise, and easily recognizable characteristics, images transcend geographical, racial, cultural, and linguistic barriers, serving as a universally understood form of communication that rapidly conveys information and resonates with audiences. By the late 19th century, with advancements in printing technology and the rise of mass media, the term "graphic design" gained widespread public recognition. In his book History of Modern Graphic Design in the World, Wang Shouzhi defines graphic design as the process by which graphic designers integrate basic elements such as graphics, typography, text, illustrations, colors, and symbols into a symbolic communication system and transform them into mass-produced printed materials. These materials not only function as precise visual communication tools but also provide the psychological satisfaction that design aims to evoke in the audience (Wang, 2018). Furthermore, with the rapid development of digital media and interactive design tools, graphic design practices have undergone significant changes in recent years, further expanding the possibilities of visual communication.

As a form of visual communication, graphic design conveys information and creativity through text, images, and graphic elements to achieve specific objectives, such as capturing audience interest, delivering messages, and establishing brand identity. However, the field of graphic design currently faces numerous challenges, including formalism, a lack of innovation, insufficient interactive experiences, and a disregard

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for audience psychological needs. Many graphic designs overly rely on traditional design patterns and formulas, focusing solely on surface-level visual effects while neglecting a deep understanding of the audience. Consequently, they fail to fulfill the fundamental purpose of design—to serve people's lives and effectively convey information. Research indicates that these issues directly impact the effectiveness of design and audience engagement, making it challenging for designers to attract users, evoke emotional resonance, and communicate messages effectively. Therefore, mastering effective graphic design methods is crucial for designers to enhance their skills, stimulate creativity, meet user needs, maintain competitiveness, and establish a personal brand.

Graphic design methods based on creative thinking, semiotic rhetoric, modular or grid systems, and genetic translation play a significant role in the creative process of designers. However, these methods are relatively complex and require a solid foundation of professional knowledge for proper comprehension and application. For example, the semiotic rhetoric approach relies on intricate semiotic theories, while modular systems demand strong logical thinking abilities from designers. Thus, researchers believe it is necessary to propose a more accessible and practical graphic design method to help a broader range of designers and design students improve their creativity and design skills.

To address these issues, researchers have reviewed a vast amount of literature and analyzed numerous outstanding graphic design works, discovering that visual illusion techniques are frequently employed in these works. As a unique design approach, visual illusion art enables designers to break away from conventional design thinking. By mastering visual illusion techniques, designers can create more innovative and expressive works. Research has shown that visual illusion techniques activate the audience's cognitive mechanisms, enhancing interactivity and visual appeal. Inspired by these findings, the researchers seek to explore methods for integrating visual illusion art with graphic design.

The researchers will outline the historical development and underlying mechanisms of visual illusion art, examine its classification and application areas, and then study graphic design methods within the context of visual illusion art. Based on these findings, they will compile a book titled Research on Graphic Design Methods Based on Visual Illusion Art. This book innovatively proposes the concept of "graphic design methods based on visual illusion art" and systematically organizes the fundamental principles, mechanisms, and classifications of visual illusion art, providing a new theoretical foundation for graphic design. Throughout the writing process, the book will deconstruct and analyze numerous classic visual illusion art cases, offering step-by-step illustrations to explain the creative thinking and drawing processes behind various types of visual illusions. Additionally, it will showcase a wide range of practical examples demonstrating the application of visual illusion art in graphic design fields such as advertising design, packaging design, and logo design. This book aims to provide practical and accessible reference material for graphic designers and design students, helping them enhance creativity and design skills, improve the uniqueness, interactivity, and visual appeal of their works, and promote innovation in the design field.

Objectives

The objective of creating the book "Research on Graphic Design Methods Based on Visual Illusion Art" is to provide practical and easily understandable reference materials for the graphic design industry, enhance the design skills of designers, and promote the development of the cultural and creative industries.

Literature review

1. Literature Related to Optical Illusion Research

Jianfeng Wang's Illusion Art Design is a comprehensive book for systematically studying and researching optical illusion art and its applications in design. This book provides a detailed introduction to the classification of optical illusion art and its specific applications in real life from both theoretical and practical perspectives. It includes numerous classic cases of optical illusion art in actual design, covering areas such as advertising design and logo design. Through case analysis, the book summarizes the advantages of optical illusion art in enhancing design effects and attractiveness (Wang, 2007).

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Illusion in Visual Design, published by Shanben Publishing Co., Ltd., is a professional book that delves into the application of optical illusion in design and its artistic expression. This book integrates extensive theoretical knowledge with practical case studies, providing an important reference for the study of optical illusion art. By elaborating on the principles of visual illusions, their types, application cases, and creative processes, the book helps designers gain an in-depth understanding of optical illusion techniques, enhancing the creativity and expressiveness of their works. These insights not only enrich the theoretical foundation of optical illusion art but also provide valuable practical experience and inspiration for innovation in graphic design methods (Shanben Publishing Co., Ltd., 2019).

The renowned psychologist and art theorist Rudolf Arnheim, in his book Art and Visual Perception, proposes that by studying the principles of visual perception, one can better understand the composition of artworks and the aesthetic experience they convey. This book emerged during a period when psychological research on visual perception was becoming more advanced. The author integrates perceptual psychology theories with artistic practice, exploring various principles of visual perception and applying them to art analysis, providing a scientific foundation for understanding the visual experience of artworks. The main content includes an explanation of Gestalt theory to illustrate the principle of wholeness in visual perception, a discussion on the representation of movement and spatial perception in visual art, and an analysis of how static images use lines, shapes, and colors to depict movement and space (Arnheim, 2019).

2. About the methods of graphic design

A review of academic research on graphic design methods reveals that it primarily focuses on four key areas. First, Graphic Design Methods Based on Creative Thinking. This method refers to a design approach in which designers, during the graphic design process, utilize cognitive psychology theories such as Guilford's (1967) divergent thinking model and the creative cognition theory proposed by Finke, Ward, and Smith (1992). It involves the use of various forms of creative thinking, including intuitive thinking, inspirational thinking, visual thinking, logical thinking, convergent thinking, divergent thinking, associative thinking, and image-based thinking, to conceptualize, create, and optimize design works. This method emphasizes breaking free from traditional thought constraints and presenting design concepts and creativity in a novel and unique way to produce graphic design works with artistic value and market competitiveness. Designers can stimulate creative inspiration through techniques such as questioning, analyzing successful cases, identifying similarities through analogy, combining design elements, and brainstorming.

Second, graphic design methods are based on semiotic rhetoric. This approach involves applying rhetorical techniques commonly used in literature—such as metaphor, symbolism, personification, exaggeration, rhetorical questions, and parallelism—to the graphic design process, thereby enhancing the effectiveness of semantic communication. In *Research on Graphic Design Methods Based on Semiotic Rhetoric*, Professor Zhi Yu discusses how contemporary graphic design is not only about fulfilling the audience's aesthetic needs but, in the context of an increasingly efficiency-driven culture, must also focus on enhancing semantic transmission. As one of the methods for improving the efficiency of symbolic meaning conveyance, semiotic rhetoric guides the semantic construction of visual symbols in a two-dimensional space, enabling highly effective communication. Therefore, research on graphic design methods cannot be separated from the methodological support provided by semiotic rhetoric. Exploring graphic design principles from the perspective of semiotic rhetoric can lead to more effective design methods in terms of form and significantly improve communication efficiency at the semantic level (Zhi & Wang, 2021). Third, ***"graphic design methods based on modularization or grid systems"***. This is a structured, efficient, and logical design approach. Specifically, modularization involves using individual modular units as fundamental elements in a repetitive and orderly organizational structure (Cai, 2020). The grid system, on the other hand, employs vertical and horizontal reference lines to divide the layout into proportionate sections, forming an organized modular structure. These modules serve as the framework for the layout, systematically organizing content, enhancing design efficiency, and allowing viewers to quickly absorb information. Graphic design methods based on modularization or grid systems help designers organize layout elements more effectively, improve efficiency, and adapt to various devices and platforms.

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However, while adhering to grid systems, designers must also maintain creativity and imagination to produce unique and outstanding design works. Fourth, graphic design methods based on translation. The term "translation" originally refers to the biological process in which genetic information transcribed from DNA into messenger RNA is used as a template to synthesize proteins with a specific amino acid sequence. When applied to graphic design, this concept involves using an initial shape as a template and following specific rules to generate new shapes while preserving the genetic characteristics of the original form. This design method provides a theoretical foundation for the computer-aided transformation and innovation of traditional patterns and offers possibilities for more complex traditional graphic design (Ma, 2018). In summary, these methods provide valuable guidance for designers in the process of graphic design creation.

In addition, Qi Hongzhou's book Research on the Principles and Methods of Graphic Design focuses on graphic design as its primary subject, delving deeply into the principles and methodologies of graphic design. The content covers the historical development, styles, design elements, and compositional forms of graphic design. Additionally, the book provides a detailed explanation of several graphic design methods, including those based on creative thinking, rhetorical approaches, and visual language. This work offers researchers a comprehensive knowledge system of graphic design, laying the foundation for proposing graphic design methods based on visual illusion art (Qi, 2016).

3. Theories related to book design

A book is a portable medium composed of a series of printed and bound pages that transcend time and space, serving to preserve, promote, and disseminate knowledge (Haslam, 2020). The process from writing to publishing is a collaborative effort that requires teamwork. Book design is a comprehensive approach to the entire book, involving various aspects such as the cover, layout, grid system, typography, fonts, text and images, production, and more. Therefore, there are abundant theories related to book design. Excellent book design can better attract readers and help them understand the content more effectively. Thus, studying theories related to book design is of great significance for the overall design and publication of Research on Graphic Design Methods Based on Optical Illusion Art.

Bookbinding: A Comprehensive Guide to Design and Techniques, authored by Morlok and Waszelewski, primarily introduces the design concepts and processes of book design, along with a detailed and professional elaboration on industrial binding techniques. The book presents unique insights into various excellent book designs from around the world, encompassing fundamental knowledge and methods related to folding, stitching, and binding (Morlok & Waszelewski, 2020).

Book Design, written by Andrew Haslam, details the entire process of book design through meticulous and rigorous text, easy-to-understand explanations, and an abundance of photographs and illustrations. It covers a wide range of topics from editorial design skills to publishing and printing knowledge, including determining book size, designing layout, constructing grids, selecting fonts, arranging text and images, designing covers, choosing paper, proofing, plate-making, printing, binding, and related theories (Haslam, 2020).

Kimberly Elam's *Grid Systems: Principles of Organizing Type* delves into the core role of grid systems in graphic design, providing a detailed analysis of how grids can be used to create clear, organized, and aesthetically pleasing layouts. The book systematically explains the types of grids, their application methods, and how to achieve harmonious arrangements of text, images, and other elements through grids, supported by numerous classic design examples. It offers practical theoretical guidance and practical references for designers, helping to enhance the logic and visual expression of their work (Elam, 2018).

Layout Essentials:100 Design Principles for Using Grids is a professional book focused on the application of grid systems in graphic design, written by American designer Tondreau. The book systematically introduces the basic concepts and structures of grids and how to use them effectively in various design projects. Through 100 design principles, it covers key elements such as grid types, typography rules, visual hierarchy, and alignment techniques. Additionally, it provides numerous case studies to help readers understand how to optimize layout design in real-world projects. Whether for books, magazines, web design, or advertising layouts, this book offers practical guidance to enhance the aesthetics

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and readability of design work. It is a valuable reference for graphic designers, visual communication students, and researchers, balancing both theory and practice (Tondreau, 2012).

Conceptual Framework

First, through a literature analysis, the concepts and principles of visual illusion were clarified, along with the historical development and classification of visual illusion art. This step provides a theoretical foundation by incorporating Gestalt theory, which explains how designers use perceptual grouping principles to create depth, movement, and figure-ground relationships. Additionally, Gregory's theory on optical illusions is referenced to illustrate how the brain's interpretation of visual stimuli can be manipulated in design.

Secondly, through field investigations and case studies, the application and social benefits of visual illusion art in graphic design were examined. This includes an analysis of how visual illusion techniques enhance designers' creativity, audience engagement, and message clarity.

Subsequently, the methods of applying visual illusion art in graphic design were systematically summarized, leading to the development and writing of the book Research on Graphic Design Methods Based on Visual Illusion Art.

Finally, to evaluate the book's effectiveness, theoretical models such as the Technology Acceptance Model (TAM) and design-specific usability frameworks will be used to assess its impact on design education, professional practice, and the cultural and creative industries. Evaluation criteria will focus on the book's practical application, usability, and its ability to improve design thinking and execution among students and professionals.

Methodology

1. Research Design

This study adopts a mixed research approach, primarily qualitative with supplementary quantitative research, aiming to comprehensively explore the theoretical foundations and practical applications of visual illusion art in the field of graphic design. Based on the mixed research framework proposed by John Creswell in Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (Creswell，2017), this study integrates qualitative and quantitative methods to deeply investigate the mechanisms and practical value of visual illusion art in graphic design.

In the qualitative research section, a systematic literature review is first conducted to examine the conceptual connotation, fundamental principles, developmental trajectory, and classification of visual illusion art. Subsequently, a combination of field research and case studies is employed to analyze the specific application models of visual illusion art in graphic design and its resulting social benefits. In addition, in-depth interviews with graphic designers and educators are conducted to collect and analyze their perceptions and practical experiences regarding visual illusion-based creative methods. Based on these findings, an innovative application framework for visual illusion art in graphic design is further summarized and developed.

In the quantitative research section, this study utilizes questionnaire surveys and statistical analysis to assess the effectiveness of the book Research on Graphic Design Methods Based on Visual Illusion Art in enhancing the design capabilities of design students and professionals. Moreover, an empirical research approach is adopted to compare the design works of participants before and after applying the methods introduced in the book. This evaluation is conducted across three dimensions: creativity, audience interaction, and visual communication effectiveness, to quantitatively measure the practical impact of these methods.

Through the organic integration of qualitative and quantitative research data, this study achieves mutual validation and reinforcement between theoretical research and practical application, ultimately forming a systematic, scientific, and practically valuable research outcome. The application of this mixed

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research approach not only ensures the reliability and validity of the research conclusions but also provides a methodological reference for further studies on visual illusion art in the field of graphic design.

2. Population and sample

The target population of this study consists of experts, young graphic designers, and design students, ensuring a diverse range of perspectives on the application of visual illusion art in graphic design. A total of 201 participants were included in the study, comprising 5 design experts, 5 young graphic designers, and 191 design students from the Sichuan Nationalities College's School of Fine Arts. The selection of these groups was intentional: experts provide professional insights into the theoretical and practical aspects of visual illusion art, young designers contribute contemporary industry perspectives, and students offer valuable feedback on the book's educational impact.

The student sample was selected using the Krejcie-Morgan sampling scale to achieve statistical validity. The study employed a stratified random sampling method to ensure representativeness across different design disciplines and academic years. The choice of students from the Sichuan Nationalities College's School of Fine Arts was based on their specialized focus on design education, making them an appropriate group for evaluating the book's effectiveness. While the study primarily focuses on this institution, its findings may offer insights applicable to a broader population of design students.

3. Research tools

This study employs two primary research tools: interview forms and questionnaires.

(1) Interview Form

The interview guide was developed based on a comprehensive literature review and refined through expert consultation to ensure content validity. It was designed as a semi-structured format, allowing both predefined and open-ended questions to facilitate in-depth discussions. In December 2024, experts and young designers in the design field were contacted and interviewed according to this pre-established guide. The interview questions covered key aspects of the book Research on Graphic Design Methods Based on Visual Illusion Art, including its practical value, applicability, and potential for enhancing design skills. Responses were recorded with participants' consent and analyzed using thematic coding to identify common patterns and insights. Experts unanimously agreed that the book is highly practical and that the visual illusion-based graphic design methods it presents can effectively improve readers' design abilities.

(2) Questionnaire

The questionnaire was developed based on the core research objectives and reviewed by design education experts to ensure clarity and relevance. It consisted of both closed-ended and Likert-scale questions to assess students' perceptions of the book's effectiveness and their satisfaction with its application. A pilot test was conducted with a small sample of students to refine question wording and improve reliability. From October 2024 to February 2025, 191 questionnaires were distributed to design students at the Sichuan Nationalities College's School of Fine Arts, achieving a 100% response rate. To assess the reliability of the questionnaire, Cronbach's alpha was calculated, ensuring internal consistency of the measurement. The collected data were analyzed using descriptive and inferential statistical methods to evaluate the book's impact on students' design learning and skill development.

4. Data collection

(1) Literature Analysis

The study employs literature analysis to examine the historical development, classification, and theoretical foundations of visual illusion art. This includes an exploration of key concepts in vision and visual illusion, the cognitive and perceptual mechanisms behind these phenomena, and their implications for graphic design. The analysis is informed by established visual perception theories, such as Gestalt principles and Richard Gregory's theory of visual illusions, to ensure a strong theoretical foundation. By synthesizing these insights, the study aims to derive systematic graphic design methods based on visual illusion art.

(2) Field Research

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Field research is conducted to gather firsthand inspiration and materials by analyzing visual illusion artworks in real-world contexts. The research includes visits to major visual illusion art exhibitions in Bangkok and Pattaya, such as the Bangkok National Museum, Bangkok Art and Culture Center, Siam Museum, River City Bangkok Art and Antiques Center, Pattaya 3D Art Museum, and Believe It or Not Museum. The selection of these locations is based on their extensive collections of visual illusion artworks and their significance in contemporary art discourse. The analysis focuses on identifying artistic techniques, interaction patterns, and audience engagement strategies that can be applied to graphic design.

(3) Interview Method

Semi-structured interviews are conducted with experts in graphic design and young designers to explore strategies for effectively integrating visual illusion art into graphic design practices. The interview guide is developed based on literature findings and pilot-tested for clarity and relevance. Data collection follows a qualitative approach, with responses recorded and analyzed using thematic coding to identify key insights and trends. This method ensures an in-depth understanding of professional perspectives on the role and potential of visual illusion art in design.

(4) Survey Method

The study utilizes a questionnaire-based survey to assess students' perceptions of the effectiveness and satisfaction with the book, Research on Graphic Design Methods Based on Visual Illusion Art. The survey targets design students at Sichuan Nationalities College's School of Fine Arts, with the questionnaire administered both online and in person to maximize participation. The questionnaire includes Likert-scale and multiple-choice questions to quantify students' learning experiences. Ethical considerations such as informed consent and data confidentiality are strictly observed to ensure the validity and reliability of the findings.

5. Data Analysis

(1) Qualitative Analysis

This study employs content analysis to systematically examine the concepts, principles, historical development, classification, and application areas of visual illusion art. The analysis process involves coding qualitative data to identify recurring themes and patterns related to visual illusion art in graphic design. Thematic coding will be conducted manually, with the assistance of qualitative data analysis software such as NVivo to enhance accuracy and efficiency. Expert interviews and field research observations will be transcribed and analyzed using an inductive approach to uncover insights into the integration of visual illusion techniques in design practices.

(2) Quantitative Analysis

Quantitative data will be analyzed using statistical tools, with Questionnaire Star serving as the primary platform for data collection and processing. Descriptive statistics (such as mean, standard deviation, and frequency analysis) will be used to summarize students' perceptions of the effectiveness and satisfaction with the book, Research on Graphic Design Methods Based on Visual Illusion Art. To assess differences between groups, statistical tests such as t-tests and ANOVA will be applied where appropriate. Reliability and validity will be evaluated using measures such as Cronbach's alpha for internal consistency and factor analysis to ensure the robustness of the questionnaire design.

Results

1. The Creative Approach of the Book Research on Graphic Design Methods Based on Visual Illusion Art

1.1 Framework Structure

As shown in Table 1, this book is divided into four chapters.

Chapter One: The Concept and Principles of Visual Illusions. This chapter introduces the definitions of vision and visual illusion, explaining the causes of visual illusions from three perspectives: physiological factors, psychological factors, and environmental factors.

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Chapter Two: The Historical Development of Visual Illusion Art. The researcher presents the development of visual illusion art using a chronological timeline. The evolution of this art form has undergone five major stages: the primitive society, ancient China, ancient Greece and Rome through the medieval period, the Renaissance, the 19th century, and the 20th century to the present. Particularly in the 20th century, movements such as Futurism, Surrealism, and Op Art significantly contributed to the advancement of visual illusion art, continuously influencing the field of graphic design.

Chapter Three: Classification of Visual Illusion Art and Its Application Guidelines in Graphic Design. The researcher categorizes visual illusions into five major types based on their external manifestations: geometric illusions, color illusions, motion illusions, spatial illusions, and ambiguous figure illusions. Accordingly, five application methods for visual illusion art in graphic design are proposed: the geometric illusion method, color illusion method, motion illusion method, spatial illusion method, and ambiguous figure illusion method. Additionally, this chapter includes four sections—original artwork analysis, drawing technique explanations, case studies, and creative exercises—allowing readers to easily master the drawing techniques of visual illusion art and flexibly apply them in graphic design.

Chapter Four: The Social Benefits of Applying Visual Illusion Art in Graphic Design. The researcher discusses the social benefits of incorporating visual illusion art into graphic design from three perspectives: enhancing visual communication effectiveness, increasing brand and commercial value, and promoting the development of the cultural and creative industries.

Table 1 The Framework Structure of the Book Research on Graphic Design Methods Based on Visual Illusion Art

Chapter	Chapter Titles	Section	Section Titles
Chapter 1	The Concept and Principles of Visual Illusion	Section 1	The Concept of Visual Illusion
		Section 2	The Principles of Visual Illusion
Chapter 2	The Development History of Visual Illusion Art	Section 1	Prehistoric Period
		Section 2	Ancient China
		Section 3	Ancient Greece, Ancient Rome, and the Medieval Period
		Section 4	Renaissance Period
		Section 5	19th Century
		Section 6	20th Century to Present
Chapter 3	The Classification of Visual Illusion Art and Its Application Guide in Graphic Design	Section 1	Geometric Illusion Method
		Section 2	Color Illusion Method
		Section 3	Motion Illusion Method
		Section 4	Spatial Illusion Method
		Section 5	Multi-meaning graphics Illusion Method
Chapter 4	The Social Benefits of Applying Visual Illusion Art in Graphic Design	Section 1	Enhancing Visual Communication Effectiveness
		Section 2	Increasing Brand and Commercial Value
		Section 3	Promoting the Development of the Cultural and Creative Industries

Source: Researcher

1.2 Layout Design

The typesetting design of a book generally follows three key steps: determining the layout, constructing the grid, and arranging the page content. Each of these steps plays a crucial role in ensuring both readability and aesthetic appeal while supporting the thematic focus of the publication.

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1.2.1 Format

The format of a book is defined by the proportional relationship between page height and width, determining the external shape of the pages. Conventionally, books are categorized into three main formats: portrait format, where the page height exceeds its width; landscape format, where the width is greater than the height; and square format, where both dimensions are equal. The choice of format not only affects the visual experience but also has implications for the print economy and usability.

For Research on Graphic Design Methods Based on Visual Illusion Art, an A4 portrait format is selected (Haslam, 2020). This choice aligns with industry standards for design publications, ensuring compatibility with printing processes and reader expectations. Moreover, the vertical orientation enhances the presentation of visual illusions by allowing for extended compositions that emphasize depth and spatial perception. Alternative formats, such as landscape or square, could have provided different aesthetic advantages, such as emphasizing horizontal movement or achieving a more balanced composition. However, the A4 portrait format strikes an effective balance between textual readability and visual impact, making it a suitable choice for a research-based design book.

1.2.2 Grid System and Layout Design

A grid system serves as a fundamental tool for integrating textual and visual elements within a page, defining the internal structure of the layout. Utilizing a grid-based approach fosters clarity, consistency, and visual harmony, ensuring a well-organized yet dynamic presentation. This structured approach enhances information credibility, improves reader comprehension, and allows for a more immersive engagement with the content.

A basic grid system establishes parameters such as white space distribution, the shape of the printable area, text column arrangements, column width and height, and spacing between elements. More advanced grids also regulate baseline alignment for text and define the spatial relationships between images, titles, page numbers, and footnotes (Haslam, 2020).

Given the book's focus on visual illusion art—a subject that heavily relies on precise spatial relationships—the grid system plays an integral role in enhancing the perception of illusions. The structure must not only provide a coherent reading experience but also facilitate the interaction between images and text to amplify the illusionary effects.

Typically, when a publication contains a substantial amount of mixed text and images or requires the integration of data charts and complex visual compositions, a four-column layout is a preferred choice (Müller-Brockmann, 2022). For Research on Graphic Design Methods Based on Visual Illusion Art, a modernist grid structure is implemented, consisting of a 20-grid system, with four primary columns subdivided into five smaller units each. This system offers flexibility in positioning visual elements, allowing for compositions that reinforce depth, movement, and ambiguity—key principles in visual illusions.

By employing this structured yet adaptable grid, the book ensures a cohesive balance between text and imagery, enabling seamless integration of visual illusion art with theoretical discourse.

2. Sample Display of the Book Research on Graphic Design Methods Based on Visual Illusion Art

Impossible figures represent a unique category of visual illusions that leverage perspective, spatial relationships, and geometric structures to create the perception of a three-dimensional form that cannot exist in reality. While these figures appear locally coherent, they exhibit inherent spatial contradictions when viewed as a whole, leading to perceptual distortions. Their defining characteristics include spatial paradoxes, visual deception, and infinite loops. Common examples of impossible figures include the Penrose Triangle, the Penrose Staircase, the Impossible Cube, and the Impossible Trident.

From a theoretical perspective, impossible figures align closely with Gestalt principles of perception, particularly the principles of closure and continuity. These principles explain why the human eye instinctively attempts to resolve spatial contradictions, thereby generating compelling visual illusions.

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Furthermore, Gregory's theory of visual illusions highlights how cognitive processes interpret ambiguous stimuli, reinforcing the ability of impossible figures to captivate viewers and challenge their spatial perception. This makes impossible figures a powerful tool in graphic design, particularly in creating visually striking compositions that provoke thought and engagement.

Figure 1 illustrates the Penrose Triangle, also known as the Impossible Triangle, a well-known visual illusion. Created by Swedish artist Oscar Reutersvärd in 1934, the Penrose Triangle was later popularized by British mathematician Roger Penrose and his father, Lionel Penrose, who published their findings in the British Journal of Psychology in February 1958. The Penrose Triangle consists of three interconnected rectangular beams that form a closed triangular structure, seemingly adhering to the principles of perspective but fundamentally impossible to construct in three-dimensional space. By skillfully manipulating perspective and visual deception, this figure challenges conventional understanding of space and structure. In Figure 1, the research presents a step-by-step depiction of two distinct methods for constructing the Penrose Triangle. These stepwise illustrations serve as instructional guides, enabling readers to rapidly grasp the techniques required to accurately render this illusion.

Figure 2 showcases the application of the Penrose Triangle in graphic design through three case studies. The first case study examines the promotional poster for the album The Story of Light by the South Korean boy band SHINee. This poster employs the Penrose Triangle to create a spatial illusion, seamlessly blending Constructivist aesthetics with the principles of visual illusion art. Positioned at the lower section of the poster, the Penrose Triangle is meticulously constructed using the three primary colors—red, yellow, and blue. As a commemorative album, The Story of Light symbolizes SHINee's musical journey, artistic achievements, and the personal growth of its members. The "infinite loop" characteristic inherent in the Penrose Triangle serves as a metaphor for SHINee's continuous evolution in their musical career, embodying their commitment to innovation and exploration of new artistic styles. This visual illusion aligns seamlessly with SHINee's avant-garde aesthetic and reinforces the group's unique identity and musical philosophy. The second case study focuses on the logo design for Palace Skateboards. The Palace logo cleverly incorporates the Penrose Triangle, presenting a closed triangular structure that cannot exist in three-dimensional space, thereby generating a captivating visual illusion. This design not only possesses a strong visual impact but also aligns with Palace's pioneering spirit as a leader in street culture. The logo features the word "PALACE" positioned along the three edges of the Penrose Triangle, employing bold, sans-serif typography. This design choice enhances the logo's modern and powerful aesthetic while ensuring legibility across various sizes and formats. Additionally, Palace's iconic logo predominantly utilizes a monochromatic black-and-white scheme, adhering to minimalist design principles. This approach ensures the logo's adaptability across diverse backgrounds and applications, maintaining high recognizability and distinctiveness. The third case study explores the branding and cultural product design by the independent studio LANGOR DESIGN. This example further demonstrates how impossible figures can be adapted to cultural and commercial products, expanding their relevance in contemporary design practice.

By integrating real-world case studies with theoretical frameworks, this book comprehensively illustrates how visual illusion art contributes to branding, advertising, and product design. Through a combination of perceptual psychology and practical applications, impossible figures serve as a bridge between artistic creativity and functional design, reinforcing their significance in modern visual communication.

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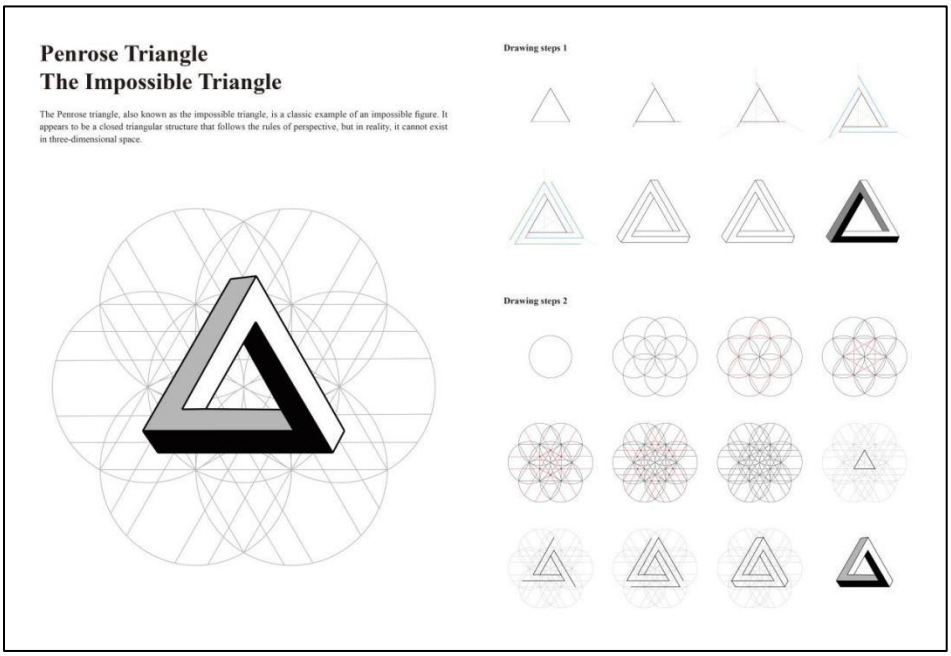

Figure 1 Book sample 1
Source: Researcher

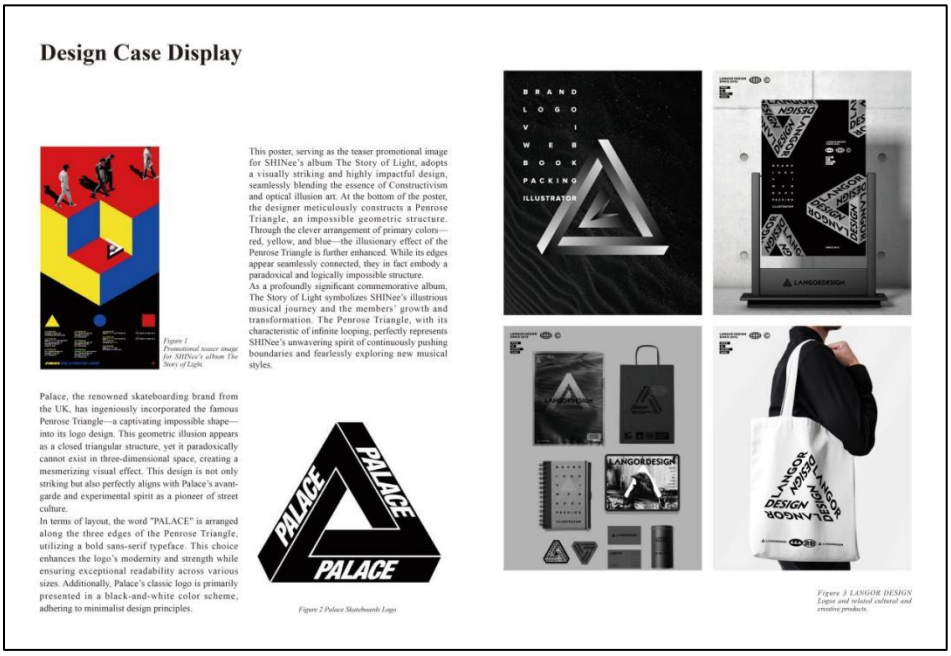

Figure 2 Book sample 2
Source: Researcher

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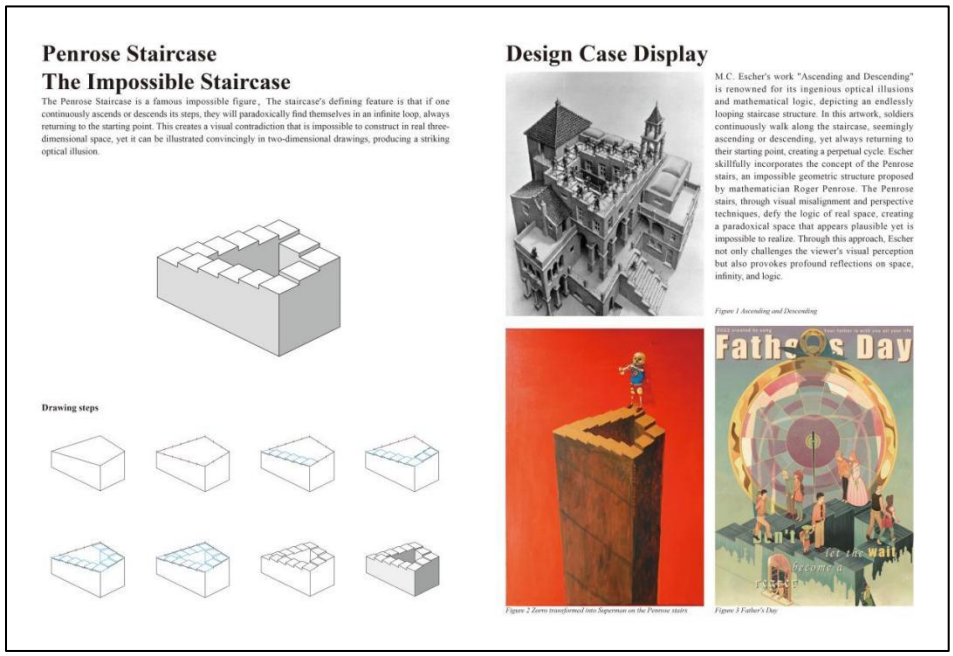

Figure 3 Book sample 3
Source: Researcher

Discussion

The monograph Research on Graphic Design Methods Based on Visual Illusion Art provides graphic designers and students in related fields with a systematic theoretical framework and practical methodologies. It not only helps designers master visual illusion techniques, enhancing their creative thinking and design capabilities, but also advances academic research in graphic design by analyzing how visual illusions challenge and expand design theories and practices.

The core contribution of this research lies in the establishment of a structured classification system for visual illusion techniques, which includes five major categories: geometric illusions, color illusions, motion illusions, spatial illusions, and ambiguous figure illusions. This classification not only enriches the methodological system of graphic design but also reveals the role of visual illusions in enhancing visual impact and information transmission. For example, the geometric illusion method employs visual elements such as shapes, lines, and angles to create misperceptions of size, angle, or spatial position. Volkswagen's print advertisement effectively utilizes the Delboeuf illusion to successfully convey the fuel efficiency of its product.

At the theoretical level, this study integrates theories of visual perception and cognitive psychology to explore the application mechanisms of visual illusions. Based on Gregory's theory of visual illusions, the research analyzes how physiological and psychological factors influence human perception and translates these insights into visual guidance strategies in graphic design. Additionally, Arnheim's theory of visual thinking supports the idea that visual illusions stimulate creative problem-solving in design through non-linear thinking. Furthermore, Roland Barthes' semiotic theory sheds light on how visual illusions enhance the symbolic meaning and semantic expression of visual communication.

At the practical application level, this research examines the value of visual illusion techniques in various areas of graphic design, including branding, advertising, and packaging design. However, its application also faces challenges related to cultural differences and technological limitations. Audiences from different cultural backgrounds may perceive visual illusions differently, affecting their effectiveness in global brand communication. Additionally, in digital media environments such as augmented reality (AR) and virtual reality (VR), hardware and technological constraints may limit the implementation of

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visual illusion techniques. Therefore, cultural adaptability and technical feasibility must be carefully considered when applying these techniques.

Moreover, this research holds significant value for design education. Incorporating visual illusion techniques into design curricula can foster students' creative thinking, conceptual development, and experimental design approaches, driving transformation in design education. The findings of this study can also contribute to optimizing design curricula and providing scientific guidance for visual communication design training, thereby improving teaching quality.

In conclusion, this study effectively bridges the gap between graphic design theory and practice by constructing a structured methodology, integrating established theories of visual perception, and proposing practical application strategies. Future research could further explore the application of visual illusion techniques in emerging digital technologies to ensure their continuous innovation and development in contemporary visual communication art.

Conclusion

This study provides a systematic and innovative approach based on visual illusion art for the field of graphic design, addressing a significant gap in design research. By constructing a theoretical framework that integrates visual illusion techniques with design practice, this research transcends the limitations of traditional fragmented studies. For the first time, it proposes a structured classification system for visual illusion techniques, encompassing five major categories: geometric illusions, color illusions, motion illusions, spatial illusions, and ambiguous figure illusions. This system offers crucial theoretical support for design methodology research.

At the theoretical level, this study innovatively combines visual perception theory with contemporary design practice by extending Gestalt Principles and Gregory's Theory of Visual Illusions. It develops a practical methodological framework applicable to graphic design, brand promotion, and user interface (UI) design. This theoretical innovation not only deepens the application value of visual illusion art in the design field but also provides new theoretical perspectives for related research.

In terms of practical application, this study focuses on exploring the transformative pathways of visual illusion technology in the cultural and creative industries, particularly its innovative applications in graphic design, visual communication, advertising, brand promotion, and UI/UX design. Research findings indicate that the integration of visual illusion technology significantly enhances visual interactive experiences, optimizes user perception, and drives innovation in commercial design, making it an essential tool for industry professionals.

Furthermore, this study opens new research directions for the application of visual illusion art in emerging technological fields, especially in augmented reality (AR), virtual reality (VR), and interactive media. Future research could further investigate the mechanisms through which visual illusions influence digital user experiences, cognitive processing, and emotional responses, expanding their innovative applications in digital interaction and immersive media. This will promote the continuous development of visual communication art and ensure that visual illusion technology maintains its cutting-edge and innovative status in the evolution of design.

Recommendation

This study reveals the significant advantages of applying visual illusion art in graphic design to enhance creativity, expressiveness, and visual appeal. Based on these findings, we propose the following recommendations:

Firstly, higher education institutions and design training programs should integrate visual illusion art into design education through specialized modules that combine both theoretical foundations and practical applications. These modules should be designed based on Kolb's Experiential Learning Theory and Bloom's Taxonomy, ensuring that students engage in hands-on projects, case studies, and experimental courses that foster deep understanding and innovation in visual illusion techniques. Practical exercises should allow students to apply these concepts in real-world design projects, enhancing both their creative thinking and technical proficiency.

Secondly, designers and professionals should actively promote the practical application of visual illusion art in commercial design, particularly in branding, advertising, and user interface (UI) design.

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Incorporating optical illusions in marketing materials, packaging, and interactive interfaces can enhance consumer engagement and brand differentiation. For instance, brands have successfully used Op Art-inspired advertising and spatial illusion techniques to create visually striking campaigns. Additionally, visual illusion techniques can improve user experience (UX) design by making digital interfaces more intuitive and engaging. To further explore the impact of visual illusion art on consumer perception and behavior, interdisciplinary collaborations between designers and psychologists should be encouraged.

Thirdly, the book Research on Graphic Design Methods Based on Visual Illusion Art should be actively disseminated as a practical guide for both academia and industry. To maximize its impact, we recommend hosting workshops, webinars, and conferences where educators, designers, and researchers can discuss the book's key concepts and applications. Collaborations with design institutions and professional associations can further promote the book's adoption in curricula and industry practices. Additionally, translating the book into multiple languages would expand its accessibility to a global audience, recognizing the universal significance of visual illusion art across cultural and linguistic boundaries.

Finally, government departments and cultural institutions should support the innovation and development of visual illusion art within the cultural and creative industries. Concrete measures should include grants and funding opportunities for projects that integrate visual illusion techniques into public art, exhibitions, and cultural products. Establishing design competitions focused on visual illusion art would also encourage emerging designers to experiment with these techniques. Furthermore, public-private partnerships could be leveraged to incorporate visual illusion art into urban development projects, such as architectural design, public installations, and immersive digital art spaces.

Additionally, future research should explore the integration of visual illusion art with emerging technologies, including augmented reality (AR), virtual reality (VR), and interactive media. Investigating how visual illusions influence user engagement, cognitive processing, and emotional responses in digital environments will be crucial for advancing both theoretical understanding and practical applications in contemporary design fields.

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