

The Functions and Practical Dimensions of Infographics in Book Design

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Abstract: Infographics represent an important means to visualize book information in the digital age. This paper employs a case study method, focusing on typical infographic design practices in recent years' book design, and points out that infographics in book design serve three main functions: reducing readers' cognitive load, enhancing the visual appeal of information, and strengthening the effects of information memory and dissemination. It also summarizes the graphic dimension, color dimension, and text dimension in the practice of book infographic design. Book design can leverage the synergy of the three practical dimensions of infographics to achieve the concrete translation of information, construct information hierarchies and color narratives, and balance the accuracy of information with visual expressiveness.

1. Introduction

The continuous and rapid evolution of digital technology has significantly fueled innovative developments in the field of information visualization, leading modern readers to increasingly demand greater information accuracy, enhanced interactivity, and deeper immersion in the content they engage with. To meet these ever-rising and sophisticated expectations, book design now faces an urgent need to actively incorporate advanced visual information expression strategies that keep pace with the digital age. Infographics, with their inherently intuitive and easily digestible nature, offer a highly innovative and promising avenue for revolutionizing book design. By visually translating abstract, hard-to-grasp information or complex, multifaceted data into clear and accessible visual forms, infographics empower readers to quickly recognize, thoroughly understand, and actively explore the underlying meaning and nuances of the content.

This article adopts a rigorous case study method, focusing specifically on diverse and representative infographic design practices in book design. It delves deeply into how infographics effectively simplify convoluted and intricate information, substantially enhance the inherent appeal of content, and strongly strengthen both the memorability of key information and the overall effectiveness of its communication. Furthermore, the various design dimensions of infographics in books are meticulously examined through the analytical lens of three core visual elements—graphics, color, and text—with each playing a unique and vital role in the overall design. The overarching aim of this study is to provide valuable theoretical references and practical, actionable guidance for professionals engaged in infographics design within the context of book creation.

2. The main functions of infographics in book design

An infographic is far more than a simple, mechanical combination of graphic elements and textual content; instead, it represents a systematic, organic integration of diverse visual symbols—including graphics, text, and color—with the ultimate goal of achieving a structured translation of complex information and presenting it in an intuitive visual form. When placed within the specific media context of books, the function of an infographic goes well beyond the superficial level of merely presenting information on the page. It further encompasses the construction of efficient, unobstructed cognitive pathways for readers, while also playing a positive role in enhancing their overall cognitive efficiency. Moreover, it significantly strengthens readers' ability to deeply understand and construct meaningful interpretations of the rich content contained within the book.

2.1 Reduce readers' cognitive load

Abstract concepts and large datasets are common in specialized books. Relying solely on textual descriptions can easily overwhelm readers with information. Infographics help readers quickly establish a cognitive framework by "extracting, reconstructing, and visualizing complex information, removing the rough and refining the essence, eliminating the false and retaining the true, and highlighting the key points"[1]. Take the infographic "From the Big Dipper to Leo"[2] in the popular astronomy book *DK Constellation Encyclopedia: A Beginner's Guide to Stargazing* as an example. Dashed arrows are used to indicate the star-finding path, transforming the spatial relationships described in the text into readily traceable visual cues. A "sickle" pattern corresponds to the six stars in Leo's neck and chest, while geometric lines outline the lion's body—linking the abstract star distribution to a concrete image and thus simplifying association. Auxiliary information, such as constellation legends and zodiac constellations, is noted in small text around the graphic's edge. This ensures the visual dominance of the core content (the star-finding path and constellation shape) while also catering to those seeking more detailed information. By leveraging infographics, this design enables "one-glance recognition" of knowledge that would otherwise require lengthy textual explanations, thereby significantly enhancing the efficiency of complex information delivery.

2.2 Enhance the visual appeal of the information

Infographics, with their visual tension and narrative quality, break the static reading mode of traditional books and transform information transmission into a visual exploration process, thereby enhancing a book's visual appeal to readers. The construction of this visual appeal varies depending on the target reader group. For child readers, infographics need to align with their concrete thinking, prioritizing high interactivity and strong storytelling. For example, Alice James' *Science Starts: The Wonderful World of Geography* employs "insect guides" as the narrative protagonists, using anthropomorphic cartoon images of small animals such as ants, beetles, and dragonflies to convey geographical and scientific knowledge through infographics, transforming knowledge exploration into a participatory adventure that aligns with children's cognitive preference for gamified learning. Its visual style favors rounded lines and highly saturated colors, presenting information in a simple, clear hierarchy, with each chart focusing on a single knowledge point. Adult readers are drawn to infographics' aesthetic appeal and logical depth. Camille Juzeau's *Natural Infographic: A Visual Exploration of the Wonders of Nature*, for instance, employs intuitive visualization to transform complex phenomena and principles from disciplines such as anthropology, astronomy, botany, climatology, geology, physics, and zoology into clear and understandable infographics. The charts, characterized by minimalist lines, high-saturation tones, and rich information hierarchies, offer

adult readers a platform for in-depth thinking and visual appreciation, thus unifying artistry and knowledge.

2.3 Strengthen the effects of information retention and dissemination

Infographics visualize information to facilitate its dissemination[3]. Compared to pure text, infographics are more effective at reinforcing information retention. Excellent infographics not only facilitate readers' reception of key information but also provide visual enjoyment and psychological pleasure, making the information memorable[4]. For example, *Hai Cuo Tu*, painted by Nie Huang, a painter from the Qing Dynasty[5], employs infographic principles to record ancient marine life through the mutual interpretation of illustrations and text. In contrast to traditional book illustrations, the creatures depicted in the book are accompanied by textual descriptions that detail their etymology, origin, physical characteristics, and other relevant information. This design not only enhances readers' retention of the book's content but also makes its dissemination more vivid and effective. This paradigm of recording marine organisms through the synergy of images and text aligns intrinsically with contemporary infographic design concepts. Another case in point is the "Key Character Relationship Diagram" in Mo Yan's *Life and Death Are Wearing Me Out*[6]. As an integral component of the book's content system, it exemplifies the innovative exploration of book design in content presentation: by breaking from the limitations of traditional text typesetting, it offers readers a novel perspective through visual charts. The chart employs lines and shapes of varying colors to differentiate between generations and relationship types, achieving a striking visual appeal through distinct color contrasts. The strategic use of colors like red and black not only immediately captures the reader's attention but also aids in the identification and memorization of different interpersonal relationships. Consequently, readers can readily recall character relationships based on their recollection of the chart, leading to a more seamless comprehension of the novel. This design effectively caters to the reader's need for efficient information acquisition while simultaneously showcasing the book design's professionalism and humanistic consideration, thereby enhancing the book's added value. As a result, the work becomes more distinctive within the landscape of similar literary creations, fostering increased reader favorability and identification with the book.

3. Three dimensions of infographics in book design

The value of infographics is becoming increasingly prominent in contemporary book design. As the renowned Chinese book designer Lu Jingren once noted, "This era demands that designers adopt novel communication strategies and design languages to encourage audiences to select books and willingly embrace the novel experience of visually transmitted information." [7] Infographics effectively overcome the limitations of traditional textual narratives in processing multi-dimensional information by simplifying complex logic, strengthening data association, and creating a visual rhythm. In doing so, they simultaneously satisfy readers' dual needs for cognitive efficiency and in-depth understanding. By leveraging the synergy of three visual elements—graphics, colors, and text—infographics establish a visual logic for information transmission across various dimensions, collectively facilitating the efficient expression of information.

3.1 Graphical dimension: Embodied translation of information achieved

As the core carrier of infographics, graphics essentially achieve the visual translation of textual information through concrete forms or abstract symbols. Concrete graphics are better suited for general audiences due to their universality, while abstract symbols excel at handling complex

logical relationships, conveying precise information in a minimalist form. In book infographics, the concretization of graphics is not a simple replication of images but a visual reconstruction based on content attributes. For instance, in popular science books, graphics must prioritize accuracy to ensure the unbiased transmission of scientific information. In *Natural Infographic: A Visual Exploration of the Wonders of Nature*[8], "The Wisdom of the Octopus" employs a cross-sectional view of the octopus as its primary visual element, outlining its body with pink lines and accurately labeling physiological structures such as the heart, nerve ganglia, digestive glands, and brain, thus intuitively presenting its unique physiological structure. Furthermore, the behavior module, accompanied by simple illustrations, showcases the octopus's camouflage, fortress construction, venom injection, exploration, and understanding, simplifying complex behavioral patterns into easily digestible visual symbols. Through figurative representation and symbolic expression in graphics, the physiological structure and behavioral patterns of octopuses are translated into a visual language. This allows readers to quickly grasp the biological logic underpinning their "high intelligence," facilitating a vivid conveyance of scientific knowledge. This design approach transforms abstract information into rhythmic, figurative graphics, maintaining scientific rigor while imbuing the information with an artistic quality, thus satisfying the reader's desire for a balance between rationality and aesthetics. In children's books, the concrete visualization of graphics carries irreplaceable educational significance. As Pang Zhuobin points out, "For children, book illustrations are the most straightforward and effective way of learning." [9] In *Science Starts: The Wonders of World Geography*, "Volcanic Eruption!" [10] replaces realistic landform photographs with a cartoon volcano. Orange wavy lines at the crater symbolize surging magma, and black smoke is depicted as spiraling lines to illustrate the diffusion path. Furthermore, surrounding insect figures guide the viewer's eye to key information points through their pointing gestures. By weakening the visual cues associated with volcanic hazards and strengthening the element of exploratory interest, this approach transforms complex volcanic science into engaging narratives. This allows children to effortlessly grasp the knowledge as if they were immersed in an adventure story, effectively bridging the gap between scientific concepts and their cognitive understanding.

3.2 Color dimension: Constructing information hierarchy and color narratives

As the most visually prominent element in infographics, color's cognitive characteristics determine its central role in information transmission. Humans recognize colors visually much faster than shapes[11]—a characteristic that naturally endows color with the functions of information layering and visual guidance. In the visual cognitive sequence of infographics, color is often the first visual signal readers capture[4]. Therefore, the color design of infographics should coordinate information hierarchy and narrative logic to achieve efficient information decoding through color coding.

Information hierarchy is established by dividing complex information into distinct visual units based on variations in color lightness, saturation, and hue, thereby creating clear primary and secondary levels. The effectiveness of different color combinations in constructing this hierarchy varies significantly: complementary colors (such as red and green, blue and orange) offer strong contrast, while analogous colors (such as blue and cyan, red and orange) provide smoother transitions. The color design of the "Formation of Caves" diagram in *Natural Infographic: A Visual Exploration of the Wonders of Nature*[8] serves as a prime example. In this diagram, blue (symbolizing water), yellow (symbolizing limestone), and green (symbolizing vegetation) are employed as the dominant colors. This color mapping of natural scenes allows for the establishment of an intuitive understanding of the geological environment, effectively transforming abstract cave components into perceptible visual symbols. High-saturation orange arrows are used as auxiliary

elements to precisely indicate key processes such as water erosion and rock deposition. By enhancing color contrast, the reader's attention is drawn to the core aspects of the geological process. To the right, a legend correlating colors and elements is included, providing a unified decoding system for the scattered color symbols and preventing visual confusion. The three-layer structure—composed of dominant colors, auxiliary colors, and legend encoding—transforms the multi-dimensional information of cave formation into an ordered color hierarchy.

The narrative function of color is manifested in its ability to simulate the dynamic evolution of information through the sequential association of visual symbols, thereby imbuing infographics with temporal or process-oriented narrative tension. This logic is vividly demonstrated by the use of color in the section "How a Four-Stroke Internal Combustion Engine Works" from the book *Science Big Bang: High-Speed Advancing Technology* [12]. Specifically, low-saturation blue and gray are employed as the primary colors of the cylinder, establishing a rational visual tone for the mechanical device and lending color support to the seriousness of the technical principle. Red is used to highlight the combustion area of the mixture, while a high-saturation yellow arrow indicates the direction of force. A black arrow serves as a visual guide, running throughout the diagram and sequentially connecting the key actions of the four strokes: intake, compression, power, and exhaust. The appearance and disappearance of yellow and black arrows, coupled with the contrasting intensity of the red-orange blocks, simulate the rhythm of mechanical movement, effectively transforming the abstract working principle into a perceptible color narrative. This design transcends the conventional role of color as a purely decorative element, instead employing it as a narrative language to convey logical information. Readers can then intuitively grasp the dynamic relationships within the four strokes through sequential color variations, resulting in the effective communication of both scientific principles and visual storytelling.

3.3 Textual dimension: Balancing accuracy and visual appeal

In book infographics, text serves as both the core carrier of content and a key element of visual composition. It must fulfill the dual functions of accurately conveying information and creating visual aesthetics, thereby achieving a deep integration of information and visual order. The section "The History of Yoga Literature" in *Natural Infographic: A Visual Exploration of the Wonders of Nature* [8], although a text-heavy infographic, effectively balances intuitive clarity in information delivery with aesthetic appeal through text layout and the supporting design elements of points, lines, and planes. Complex information—including the historical lineage, religious influences, and essential works of yoga literature—is transformed into a systematic and easily understood visual representation. This approach ensures the accuracy of the textual information (with no omission of core content and no logical inconsistencies) while also enhancing the text with visual expressiveness through layout, symbols, and colors. Readers are thus enabled to efficiently grasp the timeline and cultural context of yoga literature's evolution, achieving a truly visualized transmission of historical information and providing a model example of balanced content and form in text design for book infographics. This design concept, which unifies textual accuracy and visual expressiveness, is clearly reflected in academic infographics. For example, the archaeological work *Entanglement: An Archaeology of the Relationships between Humans and Things* extensively employs infographics to illustrate its content. One notable example is the "Seasonal Activity Diagram" [13], which is based on a concentric circle structure. The outermost layer represents the twelve months, with lines delineating the various monthly intervals, while the inner circles correspond to different types of seasonal activities. To ensure accuracy, the text meticulously records specific details of various activities, such as fishing, grazing goats, collecting eggs, and hunting bison. Additionally, different shades of gray indicate the periods when human activities are

most likely to occur. This visual layout design imbues the text with significant expressiveness, allowing readers to intuitively and swiftly grasp the seasonal patterns of human activity. It presents complex archaeological information in a clear and accessible manner, achieving a seamless integration of academic rigor and visual communication.

4. Conclusion

Infographics provide a sophisticated visual solution for effectively conveying the rich content of books through the thoughtful collaborative design of graphics, colors, and text. This well-crafted approach significantly reduces the cognitive load on readers, enhances the inherent appeal of the content, and strengthens the retention of key information. In practical applications, the infographics in design of books should adhere closely to the fundamental principle of content adaptation. For example, in popular science books, where accuracy is paramount, complex professional knowledge must be precisely and faithfully translated through carefully designed graphics that leave no room for ambiguity. For young readers, engaging anthropomorphic graphics and vibrant, high-saturation colors can effectively stimulate and sustain their interest, making the learning process more enjoyable. When addressing historical or narrative content, a clear and coherent logical framework can be skillfully constructed using timelines, symbolic codes, and a variety of well-chosen design elements to guide readers through the story.

As digital technology continues to advance rapidly, infographics in book design are undergoing a significant transformation from static presentations to dynamic interactions. Emerging technologies such as Augmented Reality (AR) and Virtual Reality (VR) hold great potential to enhance their expressive capabilities, opening up new possibilities for information dissemination. However, despite the numerous innovations in information expression, the essential synergy of visual elements must always serve the fundamental and unwavering purpose of effective information transmission. Graphics, serving as the form of an infographic, should ensure that information is presented in a concrete and easily perceivable manner. Color, functioning as the sequence that guides the eye, should create clear hierarchical distinctions between different elements and evoke appropriate emotional responses in readers. Text, representing the core of information, should skillfully balance the accuracy of content with an appealing visual rhythm that enhances readability. Future infographic design in books should not only uphold a high standard of visual aesthetics but also further reinforce the people-oriented design concept, prioritizing readers' needs and preferences. In this way, infographics can effectively serve as a robust and reliable bridge connecting the depth of book content with readers' cognitive processes, providing continuous and powerful impetus for the innovative development of traditional books in the ever-evolving digital age.

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