A Study on the Design of Visualized Expression of Picture Books Combining Text and Graphics Based on Reading Psychology

Mengyao Wang

School of Communication Design, Dankook University, South Korea, 16890, Shandong, China
wangmengyao18@gmail.com

Fang Chen

School of Digital Arts and Media, Shandong University of Arts and Crafts, Jinan, 250399, Shandong, China
chenfang2020@naver.com

Yonggang Han*

School of Digital Arts and Media, Shandong University of Arts and Crafts, Jinan, 250399, Shandong, China
160451@sdada.edu.cn

Abstract: The charm of picture books lies in the perfect art of combining text and pictures. Words and pictures are interdependent and complementary to each other, and are easier to be accepted and understood through visual expression. Therefore, we studied the topic of visual expression design for picture books based on reading psychology. We describe the characteristics of reading psychology and classify the visualization elements of picture books. It also discusses the design strategy of visual expression of picture books based on reading psychology, from the emotional guidance of color and composition: the basic design of visual expression of picture books; the visual story in text-to-picture combination: the artistic design of visual narrative of picture books; the creative fusion of visual expression: the value design of visual elements of picture books. Through the above research, we aim to strengthen the importance of visual expression in the design of picture books, stimulate readers' interest and produce deeper emotional resonance.

Keywords: Reading Psychology; Picture Book; Text-Graphic Combination; Visualization Expression; Visual Design

1. INTRODUCTION

Childhood is an important stage in the development of human beings throughout their lives. The education and thoughts received during childhood will influence the child's life. "Seeing" is an innate ability of human beings, and before children learn to use language, they "see" the world with their eyes (RAZI et al., 2023; Reider et al., 2022; Whiting, 2022). Pictures are more visual, more graphic and more attractive than words.

When the meaning of words is difficult to understand, it can be understood through pictures, which transcends the power of words to communicate and realize barrier-free reading. When children do not have the ability to understand words, images become their main source of information. As children grow up, they have the ability to understand words to a certain extent, but it is boring to read only words, so it is easier to read and understand through the combination of pictures and text (Colton et al., 2023; Garces-Bacsal, 2022; Toda & Fujii, 2023).

Regardless of the stage of development, picture books can stimulate the reader's interest in learning about themselves and the world, and form the best tool for people to learn. Before the emergence of picture books, pictures were only treated as accessories to the text, capable of explaining the content of the text, and even after the deletion of the pictures, the meaning of the text could still be interpreted in its entirety (Arita & Kaneko, 2022; Maruyama, 2022; Suzuki et al., 2022). This way of expression weakened the role of pictures, and in order to finish a book quickly, ignoring the content of the pictures, the problem of forgetting the book after reading it might occur, affecting the educational effect of the book on the readers. After the emergence of picture books, pictures are independent of words and can express personal situations or artistic concepts. When pictures and text are skillfully designed together, the pictures can tell a story independently of the text, and the text can supplement the explanation (Akyol, 2024; Takai et al., 2022; Zou, 2023). In areas where text is missing, pictures are used to supplement the illustrations, resulting in a visual expression design that combines text and pictures to create a deeper narrative and enhance memory. Therefore, based on the psychology of reading, this paper investigates the topic of visualization design of picture books with text-graphic combination.

2. CHARACTERISTICS OF THE PSYCHOLOGY OF READING

In the process of reading picture books, there are five parts, including perception characteristics, attention characteristics, memory characteristics, thinking and imagination characteristics, personality and social development characteristics, etc. Through good reading behavior, children can form good personality and social characteristics (Lian et al., 2023). When reading, children do not perceive words and pictures clearly and perfectly, and usually follow their own interests. In the perception of reading psychology, they cannot be controlled by rational goals. The

process of drawing pictures can be used to capture attention through abstract and figurative forms, and then to cultivate reading skills through colorful, fresh and interesting things, and movement.

3. THE VISUALIZATION ELEMENTS OF PICTURE BOOK TEXT AND GRAPHICS

Picture books, whether written or unwritten, are designed to tell a story with pictures as the theme. In terms of visualization, picture design is the main element. Different colors, different scenes, and different stories can convey emotions with different visual elements (Björklund & Palmér, 2022; Camilla, 2022; Kimura, 2022). The visualization elements are shown in Table 1 below.

Table 1(a): Table of Elements of Picture Book Visualization

Visual Elements	Describe	Example
Color Matching	Coordinated or contrasting color combinations create an emotional atmosphere	In 'Little Yellow and Little Blue', the contrast between yellow and blue symbolizes the individual differences between the two characters, while the fused green symbolizes the harmony of friendship
Composition Design	The layout and arrangement of the screen guide the flow of vision	In "The Hungry Caterpillar," readers are guided to follow the growth trajectory of the caterpillar through the gradual increase and change of food on each page
Image Details	Detail elements in the picture enhance the narrative effect	In 'Guess How Much I Love You', deep maternal love is conveyed through the body language and facial expressions between the big rabbit and the little rabbit
Text Layout	The font, size, and arrangement of text complement the image	In 'The Tree of Love', the text is concise yet profound, and the layout echoes the images of the trees, creating a harmonious visual unity
Blank Art	The unfilled part in the picture triggers imagination	In "The Snowman," the scene of the snowman leaving alone at night is left with a lot of blank space, allowing readers to imagine the snowman's whereabouts and emotions on their own

Table 1(b): Table of Elements of Picture Book Visualization

Visual Elements	Describe	Example
Symbols And Metaphors	Images or elements represent deeper meanings	In 'Grandpa Must Have a Way', the fabric in the grandfather's hand symbolizes the warmth and inheritance of the family. Through continuous modification of fabric products, it conveys the value and continuation of family affection
Interactive Elements	Incorporating touchable and operable elements to increase interactivity	In the "Guess Who I Am?" series of books, the foldable design of animal body parts allows readers to enjoy interactive fun while searching for answers

As shown in Table 1, the theme and emotion of the story are cleverly conveyed through coordinated or contrasting color combinations. The compositional design guides the reader's eye flow and enhances the narrative effect of the picture. Convey more information and emotions through fine detailing of images. Reasonable text layout, and images complement each other, together build a complete narrative space. Through the use of white space, the reader's imagination and associations are triggered, making the story more flavorful. Through the symbolism of images or elements, deeper meanings and emotions are conveyed (Laboy et al., 2023). Increase the interactivity and fun of picture books by incorporating touchable and manipulative elements.

4. DESIGN STRATEGIES FOR COMBINING TEXT AND GRAPHIC VISUALIZATION EXPRESSION IN PICTURE BOOKS BASED ON READING PSYCHOLOGY

4.1 Emotional Guidance of Color and Composition: Basic Design for Visual Expression in Picture Books

Color is one of the most direct and powerful elements of visual expression. In picture books, impressive visual effects are created through creative techniques such as color contrast, gradients and emotional mapping. The selection and matching of colors are carefully designed according to the plot and theme of the story to achieve the best visual effects and emotional expression. Composition is an important part of the visual expression of picture books (Acerbi, 2022; Chapman, 2022; Mizunuma & Tsuji, 2022). Break the conventional layout method and use composition techniques such as perspective and hierarchy to create a

visually impactful picture. The innovation of composition can not only guide the flow of readers' eyes and improve the coherence and depth of reading, but also enhance the narrative and expressive power of the story. Through the hierarchical arrangement of the front and rear backgrounds, a sense of depth and space is created in the picture, enhancing the reader's sense of immersion. Place an element in the picture in a prominent position and emphasize its importance through contrasting techniques such as size, light and dark. By rationally arranging the picture elements, the picture can be visually balanced and give people a stable and comfortable feeling. Adopt classical composition such as golden section composition or symmetrical composition to make the picture more harmonious and beautiful. Tilt composition or irregular composition and other innovative ways to break the traditional framework, to create a more vivid and interesting visual effects. Warm colors such as red, orange, and yellow have a warm, energetic, and happy emotional guidance effect, and are suitable for expressing warm family scenes, a cheerful holiday atmosphere, or the inner joy and hope of the characters. Blue, green, purple and other cool colors, with serenity, far-reaching, melancholy emotional guidance effect, suitable for depicting the night, the sea, forests and other natural scenes, or to express the character's loneliness, thinking and other inner feelings. Contrasting colors can visually express conflict and tension. Contrasting colors in picture books can highlight conflicts and emphasize the tense atmosphere. Similar colors can visually express harmony and unity, and are used to create a warm and harmonious atmosphere. In terms of composition, through balanced composition, golden section composition, near and far hierarchical composition, focus composition, repetitive composition, etc., to build up a sense of rhythm of the picture, and to strengthen the unity of the overall visual expression of the design.

4.2 Visual Storytelling in Text-Graphic Integration: The Artistic Design of Visualized Narratives in Picture Books

Picture book visualized narrative is one of the unique narrative modes of picture books. Through rich pictorial details, symbols, metaphors and other techniques, picture books can expand the narrative space and enhance the richness and multiple meanings of stories (Karwath et al., 2023). The visual narrative of picture books can not only show the storyline and characters intuitively, but also convey the emotion and meaning that are difficult to be expressed in words through visual language. Therefore, in the design of picture books, the creative integration of picture book visual narrative is crucial. Through careful conceptualization and detailed

depiction, images and words are closely integrated to build a complete and vivid story world. In picture books, there is a connection between words and images, with the upper part of the picture being a free, happy and powerful area, and the corresponding lower part being a solid and stable area. The upper part of the picture is seen as the "sky" and the lower part as the "ground" (Sosteric, 2013). In terms of visual effect, the visual weight is concentrated at the bottom, which makes people more stable and calm; the higher the visual weight is, the more active and active the picture becomes, and the example of narrative art design combining text and graphics is shown in Figure 1 below.

（ **a** ）   （ **b** ）

Figure 1: Graphic Design of Narrative Art That Combines Text and Graphics

As shown in Figure 1, (a) is the story of Little Red Riding Hood on her way home. Little Red Riding Hood is at the bottom of the picture, kneeling on the ground. The outline of the character is mainly triangles, forming a calm and practical visual expression design. (b) is a story about Little Red Riding Hood continuing to move towards home. Little Red Riding Hood is in the upper position of the picture, and Little Red Riding Hood stands on both legs. Compared with (a), it has more possibilities for movement, forming a lively and active visual expression design (Yang et al., 2022). The image itself has a narrative function and conveys emotions and artistic conception that words cannot express. Text and pictures complement each other and together form a complete story. Through visual elements, they can arouse emotional resonance in readers and guide readers to produce specific emotions, thus achieving a visual expression of emotion through the combination of text and pictures.

4.3 Creative Integration of Visual Expressiveness: Value Design of Visualization Elements in Picture Books

The choice of materials and techniques also has an important impact on the visual effect and artistic value of picture books. Different materials and techniques can show different artistic styles and texture effects (Ito et al., 2022). Hand-drawn picture books have a unique artistic flavor and hand-drawn texture, while digital synthesis technology can create a more detailed and realistic picture effect. Traditional techniques such as collage and paper-cutting can also bring a unique visual experience to picture books. The elements of visual expression are shown in Table 2 below.

Table 2: Table of Elements of Visual Expressiveness

Visual Expression Elements	Creative Integration Approach	Value Embodiment
Color Creativity	Color contrast, gradient, emotional mapping	Enhance the emotional tension of the image, create a unique atmosphere, attract readers' attention, and promote emotional resonance
Composition Innovation	Breaking the conventional layout, using perspective and hierarchy	Create visual impact, guide readers' gaze, enhance the coherence and depth of story narration
Image Narrative	Rich in details, combining symbolism and metaphor	Expand the narrative space, enhance the richness and ambiguity of the story, and stimulate readers' imagination
Materials and Techniques	Collage, hand drawing, digital synthesis, etc	Display diverse artistic styles, increase visual depth, and enhance the artistic value of works
Interactive Elements	AR augmented reality, movable mechanism design, etc	Enhance reader engagement, make the story more vivid and interesting, and improve the reading experience
Cross Media Integration	Combining music, animation, physical toys, etc	Breaking the limitations of a single medium, creating a comprehensive sensory experience, and expanding the expressive power of picture books

As shown in Table 2, in the design of picture books, appropriate materials and techniques are selected according to the style and theme of the picture book, and unique artistic charm is shown through creative

integration. Add interactive elements such as AR augmented reality and movable mechanisms into picture books to enhance readers' sense of participation and experience (Li & Jiang, 2023). Combining cross-media elements such as music, animation, and physical toys breaks the limitations of a single medium and creates an all-round, multi-dimensional sensory experience. These creative integration methods can not only enhance the fun and appeal of picture books, but also broaden the expressiveness and communication power of picture books, convey more concrete visual elements to picture books, and improve the appeal of picture books.

5. CONCLUSION

In recent years, picture books have stood out among pictorial literature with their unique charm. Picture books are not only a simple illustration of words, but also contain the art of in-depth integration of words and images. In a picture book, if you remove the pictures or words alone, you can't form a continuous and complete story, only the combination of words and pictures can express the connotation of a picture book. Picture books have a profound impact on readers' reading psychology and emotional world through the way of visual expression. Therefore, this paper studies the visual expression design of picture books by combining text and pictures from the perspective of reading psychology. From the aspects of color and composition, visual storytelling, creative integration, etc., it maps the real world more intuitively, figuratively and interestingly, providing readers with a window to explore the unknown and understand the world.

References

Acerbi, A. (2022). From storytelling to Facebook: content biases when retelling or sharing a story. *Human Nature*, *33*(2), 132-144.

Akyol, T. (2024). Promoting Young Children's Right to Participate in the Classroom through Picture Books. *Child Indicators Research*, 1-21.

Arita, Y., & Kaneko, K. (2022). Scene Change as Artistic Essence and Art Educational Significance of Picture Book. *Studies in Art Education*, *54*(1), 9-16.

Björklund, C., & Palmér, H. (2022). Teaching toddlers the meaning of numbers—connecting modes of mathematical representations in book reading. *Educational Studies in Mathematics*, *110*(3), 525-544.

Camilla, B. (2022). HannaPalmér.teaching toddlers the meaning of numbers connecting modes of mathematical representations in book reading. *Educational Studies in Mathematics*, *110*(3), 525-544.

Chapman, K. (2022). Bang goes the book--Lighting the fuse for the end of chemistry textbooks, Kit Chapman says it's time to find course materials online. *Education in chemistry*, *59*(2), 40-40.

Colton, J., Serafini, F., Lovett, T., Forrest, S., Gale, J., Gehling, K., Shin, A.-M., & Carter, J. (2023). Readers matter: seven transactions with the visual, linguistic and material elements in a picture book. *The Australian Journal of Language and Literacy*, *46*(3), 219-231.

Garces-Bacsal, R. M. (2022). Diverse books for diverse children: Building an early childhood diverse booklist for social and emotional learning. *Journal of Early Childhood Literacy*, *22*(1), 66-95.

Ito, H., Akahane, N., & Tashiro, K. (2022). Study of "Stumbling Blocks" in Visual Expression Activities. *Studies in Art Education*, *54*(1), 33-40.

Karwath, C., Attig, M., Von Maurice, J., & Weinert, S. (2023). Does Poverty Affect Early Language in 2-year-old Children in Germany? *Journal of Child and Family Studies*, *32*(8), 2254-2270.

Kimura, Y. (2022). A Basic Study on Science Picture Books for Potential Use in Early Childhood Science Education: Focusing on the Relationship with the "Environment" of the Course of Study for Kindergarten. *Journal of Science Education in Japan*, *46*(4), 360-369.

Laboy, L., Elrod, R., Aronson, K., & Kester, B. (2023). Room for Improvement: Picture Books Featuring BIPOC Characters, 2015–2020. *Publishing Research Quarterly*, *39*(1), 47-60.

Li, F. Y., & Jiang, Q. (2023). Visual Balance Optimization Simulation of Web Interface Based on Information Graphics. *Computer Simulation*, *40*(7), 195-199.

Lian, X., Hong, W. C. H., & Yu, J. (2023). An eye-tracking study on autistic children's visual attention: The use of spatial-progression, time-sequence, colours and shape-patterns in picture book designs. *Current Psychology*, *42*(23), 19548-19560.

Maruyama, S. (2022). 'Hands' Picture Book for Children. *THE JAPANESE JOURNAL OF PSYCHOLOGICAL SCIENCE*, *43*(1), 36-52.

Mizunuma, Y., & Tsuji, K. (2022). LGBTQ Book Holdings in Japanese Public Libraries. *Journal of Japan Society of Library and Information Science*, *68*(2), 73-94.

RAZI, N. A. A., JAMIAT, N., KISHORE, R. H., SEKHAR, A. C., PATRO, P., CHAGANTI, P., MEHTA, E. S., PADHI, S., SYIFAURACHMAN, A. W., & PRANATA, Y. A. (2023). CHILDRENS'HAPPINESS, ENJOYMENT, PERCEIVED MOTIVATION AND ACHIEVEMENT TOWARDS SCIENCE AUGMENTED REALITY PICTURE BOOK. *Journal of Theoretical and Applied Information Technology*, *101*(3), 1029-1037.

Reider, L. B., Mahaffey, E. M., Barylski, B., & LoBue, V. (2022). "It bites!": The transmission of negative information about snakes and spiders through a naturalistic picture book interaction. *Developmental psychology*, *58*(11), 2140.

Sosteric, M. (2013). The Devil's Picture Book. *The Socjournal*.

Suzuki, C., Kobayashi, Y., & Murata, S. (2022). Impact of Differences in Worksheets on the Learning Effect of Picture Book Utilization Classes. *Japanese Journal of Educational Media Research*, *28*(2), 15-26.

Takai, N., Komoda, M., & Ito, K. (2022). Effects of Introducing the Picture Book Reading Program in Young Children's Homes. *RESEARCH on EARLY CHILDHOOD CARE and EDUCATION in JAPAN*, *60*(3), 11-22.

Toda, S., & Fujii, H. (2023). Projection Mapping-Based Interactive Gimmick Picture Book with Visual Illusion Effects. *Journal of Robotics and Mechatronics*, *35*(1), 125-

135.

Whiting, C. M. (2022). *Dogs in the Athenian Agora.* American School of Classical Studies at Athens.

Yang, Y., Zhang, M., Sun, Y., Peng, Z., Zheng, X., & Zheng, J. (2022). Effects of advance exposure to an animated surgery-related picture book on preoperative anxiety and anesthesia induction in preschool children: a randomized controlled trial. *BMC pediatrics*, *22*(1), 92.

Zou, Y. (2023). "You Can Choose": Didacticism and the Struggle for Power in Chinese Parent/Child Dyad Book Choices. *Children's Literature in Education*, *54*(2), 236-254.