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INNOVATIVE DESIGN OF VISUAL FLOWS FOR CHILDREN'S PICTURE BOOKS IN THE DIGITAL AGE

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The advent of the digital age and the development of information technology have given rise to the form of digital picture books as we know it today. The shift in the medium of picture books has concomitantly led to a shift in reading mode from traditional paper reading to screen reading, exerting an influence on children's picture books that rely on the five senses of reading. The reading dynamics of paper picture books encompass a range of horizontal, vertical, bi-directional, Inverted, rotary and three-dimensional reading. Digital picture books have expanded interactive, immersive and AR reading. Consequently, designers must innovate with the times in the design of the visual flows of picture book reading, exploring a multimodal and comprehensive reading form of digital picture books.

Key words: media books, visual streams, digital age, multimodal form of reading, reading model, flipbook, animation, multisensory experience, 3D-books.

INTRODUCTION

Children's picture books are a type of art that relies on the interrelationship between the written word and visual images to drive the storyline, which can stimulate children's interest in reading, give them aesthetic inculcation, and activate their imagination and creativity [1]. Young children mainly communicate with the external environment and acquire information through direct and objective motor behaviours, and their perceptual experience of reading is established through the five senses of the human body (sight, hearing, taste, smell and touch). Parent-child reading will turn over, open, draw, pull, dial, turn and other actions introduced into the children's reading behaviour, can enhance the exchange of information and behavioural experience between children, parents and books, and cultivate children's interest in behavioural participation in reading (Haruyoshi Nagumo, 2015). The traditional paper-based children's picture book visual flows design is very in line with this characteristic, which has resulted in a variety of picture books layout. Visual flow refers to the way a viewer's eye moves through a composition, creating a sense of movement and direction. It plays a crucial role in guiding the viewer's attention and can enhance the overall unity of the piece [2]. The visual flow design of picture books has unique characteristics in guiding reading. The visual flow design of digital picture books in the era of screen reading has also undergone innovation. How to expand reading forms through digital technology while



maintaining the characteristics of paper books is the research direction of this paper.

PURPOSE

By classifying and analysing the design of the visual flow layout of the existing traditional picture books, and at the same time expanding the design form of the special visual flow of digital picture books under the screen reading carrier.

RESULTS AND DISCUSSION

Sort and classify the reading flow of classic picture books published domestically and internationally in the past 30 years, put out the analysis of the characteristics of different types of visual flow lines. At present, the vast majority of paper picture books on the market flip pages in a left-right direction, and there are also a few children's picture books that break this rule and design some creative reading methods based on the story content. It can be summarised in six broad forms: horizontal, vertical, bi-directional, Inverted, rotary and three-dimensional reading.

Horizontal Reading. Horizontal reading is characterized by reading from left to right. This is the most common way of designing a frame, directing the reader to turn the pages from left to right, front to back. Most picture books are read horizontally. Tatsuya Miyanishi, a famous picture book author, believes that picture books are "page-turning art", and that interactivity can be incorporated into regular reading routines, such as digging holes and cutting corners in the inside pages of a book according to the content of the book, or "burying baggage ". Picture books have this Snake Belly picture book design in addition to the usual book binding design.

Vertical Reading. Vertical reading refers to reading from the top down, or bottom up. This is reflected in a change in spine position from the conventional left-hand binding to a top or bottom binding, which guides the reader through the book in portrait orientation. For example, *The House on the 100th Floor of the Sea* uses the head of the book as the spine, and each turn of the page gives you a view of different depths of the sea, while *The House on the 100th Floor of the Sky* uses the foot of the book as the spine, and each turn of the page gives you a view of different heights of the sky, both of which are designed to have a longitudinal reading motion, with different lengths of the edges of the spine, according to the content of the story. The highlight of the design of this type of picture book is the perfect combination of vertical page flipping with story plot and visual design, which is innovative.

Bi-directional Reading. *The Cowardly Giant and the Audacious Sleeping Mouse* is a book without a back cover, with two covers, one for the Cowardly Giant and the other for the Audacious Sleeping Mouse. When reading this book, you need to turn the pages from front to back as well as back to front, and slowly you will realize that the two characters start their stories at opposite ends of the book, and they come closer and closer together until they cleverly merge into the same picture on the middle page of the book [3]. The ingenious design promotes the proximity and meeting of the protagonists and brings the reader to a satisfying conclusion.

Inverted Reading. A masterpiece by Koya Anno, *Upside Down Country* is an ingenious and well-designed picture book that combines science and philosophy



into a humorous visual game in which each page can be read upside down and reversed 180 degrees, allowing young readers to visualize and understand the abstract philosophical concept of relativity.

Rotary Reading. If at first glance you don't see it, the text and pictures can be read like a steering wheel with a 360-degree rotation, and there is almost no distinction between left and right. The story is fun and philosophical: change your perspective and the world will be a very different place. The perfect combination of story idea and rotating reading flow reflects the ingenuity of the book's creators and designers.

Three-dimensional reading. 3D picture books superimpose real physical space and virtual reality content to form a dynamic and static, virtual and real text content, which can provide a more unique visual and spatial experience. The design of the three-dimensional picture book breaks through the limitations of the plane in the reading flow, presenting a multi-angle visual flow through the folding, cutting, switching and three-dimensional modelling of the paper, creating a sense of space and guiding the narrative and performance.

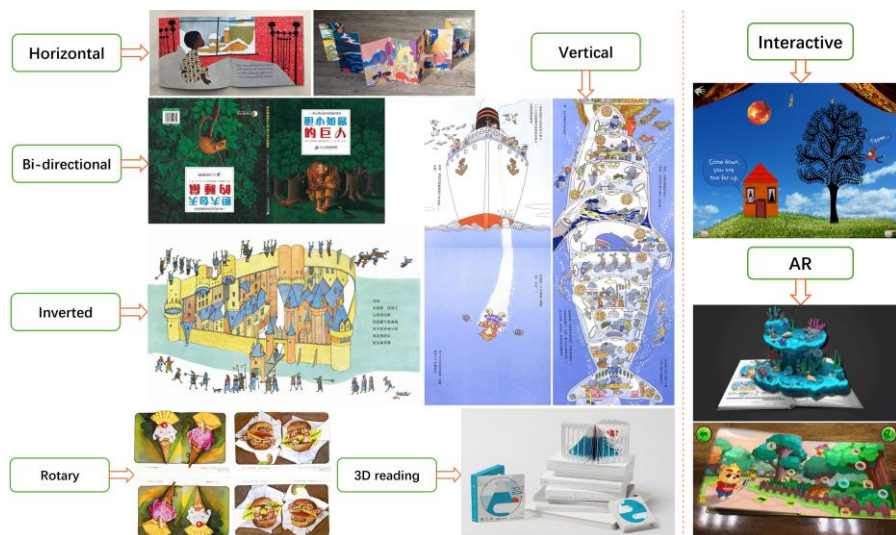


Fig.1. Six types of Reading forms in paper picture books and two types in digital picture books

The advent of the digital age has brought reading into the age of screen reading. The main feature of the visual flow design of digital picture books is the conformity of interactive reading. The actions of turning, opening, drawing, pulling, turning, etc. in traditional paper reading are transformed into touch gestures in the process of screen reading. The visual flow is often guided by interactive icons, symbols, text layout, dialogue boxes, etc., while simulating the physical flipbook



effect through the form of animation. In addition, character animation and animation effects will be added to the screen, combined with sound, music, dubbing and other multimodal extension of multi-sensory experience to achieve the effect of immersive reading. AR picture books can be seen as virtual 3D picture books, which display the spatial effects of the shapes in the picture books through the screen.

CONCLUSIONS

Digital picture books not only need to retain the functionality of physical books in terms of visual flow design, but also need to be creatively designed through the combination of images, stories, narratives, content, sound, animation, and other forms. Through animated, interactive digital content, book app designers can expand upon a book's central theme, engaging users in a more immersive manner [4]. At the same time, visual flow guided reading design is not just the patent of designers, allowing readers to participate in picture book creation and design through richer reading forms can better reflect the creativity and ingenuity of picture books.

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ІННОВАЦІЙНИЙ ДИЗАЙН ВІЗУАЛЬНИХ ПОТОКІВ ДЛЯ ДИТЯЧИХ ІЛЮСТРОВАНИХ КНИЖОК В ЦИФРОВУ ДОБУ

Наступ цифрової ери та розвиток інформаційних технологій спричинили появу цифрових книжок із зображеннями, звичних сьогодні. Поява ілюстрованих медіа-книжок одночасно призвела до зміни способу читання від традиційного (на папері) до читання з екрана, справляючи вплив на дитячі ілюстровані книжки, які спираються на п'ять органів чуття. Динаміка читання паперових ілюстрованих книжок охоплює діапазон горизонтального, вертикального, двонаправленого, перевернутого, поворотного та тривимірного читання. Цифрові ілюстровані книжки розширили можливості інтерактивного, доповненого читання. Дизайнери активно впроваджують інновації у дизайні візуальних потоків читання ілюстрованих медіа-книжок, досліджуючи мультимодальну форму читання.

Ключові слова: медіа-книжки, візуальні потоки, цифрова епоха, мультимодальна форма читання, модель читання, фліпбук, анімація, мультисенсорний досвід, 3D-книги.