Bibliometric Analysis of Review on Picture Book Creation Methods in the Chinese Context based on CNKI Database

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Abstract
In the current context of Chinese picture book creation, a large number of picture book creators have emerged, but there is a significant gap in the literature review of research on Chinese picture book creation. Based on the CNKI database, this article uses a bibliometric approach to fill the gap in the literature review of Chinese picture book creation. The article provides a review of research on the creation of illustrated books in China. Through the method of review by keyword metric analysis, the research hotspots and research topics in the field of picture book creation research are elucidated. The results of the study reveal several major areas of concern to researchers of picture book creation in China. As a specific discipline of design and creativity, a review of the ways and means of creating picture books is particularly important.

Keywords: Chinese Context, Creative Methods, Picture Books, Bibliometric Analysis, CNKI Database

Introduction
As picture book creation is an integral part of the field of picture book research, a literature review on the topic of picture book creation is a preparatory task for the study of picture books. Although there are studies related to picture books in two databases, Scopus and Web of Science Duckworth (2022); Gu et al (2022); Zheng et al (2022), most of the studies are interdisciplinary with other disciplines such as psychology and education and are not directly related to the study of picture book creation. The academic databases show that no scholar has conducted a literature review of picture book creation in China. As for research in the area of bibliometrics, there are many scholarly articles available, with some scholars using quantitative analysis software to review relevant literature in their research areas Kokol et al (2021) and some scholars using cite space to extract the content of web of science literature and construct a conceptual methodological framework Geng et al (2022), and some scholars have used citation-based quantitative analysis for their research question (Gremeaux &
Coudeyre, 2010; Rashid et al., 2021). In the field of research on methods of picture book creation, little research has been conducted on this topic using a bibliometric approach. Therefore, the author intends to use this method to conduct a quantitative literature analysis of research in this field and perform a cluster analysis of the topic. The study aims to identify the key areas of research and future trends in the field of picture book creation in China, as well as to address the lack of information on picture book creation methods in the existing literature review. The findings suggest that picture book creation, the narrative structure of picture books, and the application of emerging technologies in interactive picture books are three important topics in this field. Among them, the study of reader-object feedback, interactive narratives with picture books, and the use of new technologies in the creation of interactive picture books are the focus of future research in this field.

Materials and Methods

Bibliometrics is a research method used to observe progress in a field of study. Researchers generally use keywords, authors, countries, and other factors to analyze the literature in relevant databases. In recent years, some scholars have analyzed COVID-19-related research using bibliometrics Chen (2020); others have reviewed STEM education using quantitative analysis of the literature (Ng & Chu, 2021). Some scholars have emphasized the potential of bibliometric research to contribute to theory and practice, while also addressing criticisms and proposing a multifaceted approach to enhance understanding and contributions in advancing theory and practice Mukherjee et al (2022), and others have examined half a century of hotspots, nodes, bursts and trends in antipsychotics and schizophrenia through an econometric analysis of the literature in many databases (Sabe et al., 2022). Although bibliometric research methods are not new in the field of literature review, no scholars have yet used this measurement analysis method for literature review studies on picture book creation. CNKI, one of the most authoritative and comprehensive databases in China, contains a large amount of literature on picture book creation by Chinese scholars in recent years. And precisely because the CNKI database can only be analyzed using Cite space software, authors have not hesitated to choose it. Unlike other analysis software such as ATLAS. ti, Cite space limits the determinants of literature analysis to keywords, countries, and authors. The main study consisted of seven steps, with three stages in total (see Figure 1): Stage 1 - the planning stage, where keywords to be studied and suitable research methods were screened according to the research topic and suitable data were retrieved; stage 2 - the preparation stage; and stage 3 - the analysis stage, where the clustering graph report is exported from Cite space, and the picture information is analyzed and interpreted to illustrate its significance.
Planning the Review

Step 1: Determine the research methodology of review according to the research topic

Step 2: Determine the keywords and retrieve the database according to the research topic

Conducting the Review

Step 3: Literature retrieval was conducted based on CNKI database 710 search results.

Step 4: Review the retrieve literature to identify research papers with direct links to the 213 Articles selected for full review.

Step 5: The retained references were first exported from CNKI in Refwoeds format, then the keywords were imported into Citespace for format conversion, and finally keyword analysis was performed.

Reporting and Dissemination

Step 6: According to the results of keyword analysis, cluster diagrams are derived, and each cluster is illustrated by subject classification. Literature topics include: (1) Children's picture books, (2) Creation of picture books, (3) Picture books, (4) Narrative Structures, (5) Science picture books, (6) Illustration design, (7) Interactive narrative, (8) Children and adolescents

Step 7: Report the findings

Figure 1. Diagram of Research procedure

Analysis of Keywords

Based on the previous narrative, the research process can be described as follows. The authors searched the CNKI database from January 2012 to the present through the use of bibliometric methods. The process limited the search results to a defined area of illustrated book creation using keywords that were rigorously screened by the authors, while limiting the period to the last five years, i.e. 2017 to 2022. Other relevant search criteria, such as database, keywords, intervention comparisons, and output methods, can be found in Table
1. The keywords 'picture book*design' or 'picture book*creation' or 'picture book*creation' or 'picture book*design' were used to filter the final selection to 710. On this basis, the themes that emerged were synthesized and evaluated, and 213 papers were selected for retention.

Cluster Analysis (Based on Keywords)

By using Cite space, the researcher can explore the relationships between the different clusters through a visual clustering network to analyze the main keywords. In response to the clustering results of this study, these clusters represent research topics in the field of picture book creation. The detailed process of using the cluster analysis method is as follows. Firstly, the data retrieved from the CNKI database was downloaded in ReWorks format and imported into the cluster analysis software Cite space and converted into analyzable data. Once the preparations were all in place, keyword options were set in Cite space, which were then used to generate the rendering of the graphical and documentary data. The themes of the individual clusters were analyzed in the exported visual cluster network. Based on the above, the research on picture book creation in China was divided into four themes and eight thematic sub-clusters using the CNKI repository, and the above clusters will be analyzed and discussed after the report is produced. In using Cite space, the author found that after analyzing the results exported from the Chinese literature database, the labels on the graphs were in Chinese. The author kept the Chinese text and used Table 3 to illustrate the specific meanings represented by the colors and text.

Table 1

Logic networks based on keyword recognition. * denotes the word "and".

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Database</th>
<th>Comparison of interventions</th>
<th>Output method</th>
</tr>
</thead>
<tbody>
<tr>
<td>picture book*creation</td>
<td>CNKI</td>
<td></td>
<td>Design studies</td>
</tr>
<tr>
<td>Picture book*creation</td>
<td></td>
<td>Picture stories</td>
<td>Design performance</td>
</tr>
<tr>
<td>Picture book*design</td>
<td></td>
<td>Children's picture books</td>
<td>Narrative structure</td>
</tr>
<tr>
<td>Picture book*creation</td>
<td></td>
<td>Picture reading book</td>
<td>Graphic Narrative</td>
</tr>
<tr>
<td>Picture book*design</td>
<td></td>
<td>Picture course</td>
<td>Creative practice</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Creative studies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Design studies</td>
</tr>
</tbody>
</table>
Figure 1. Keywords cluster related to the picture book creating research

Table 1

<table>
<thead>
<tr>
<th>Topics</th>
<th>Color</th>
<th>Keywords (2017-22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children's picture books</td>
<td>Green</td>
<td>Children’s picture books, original stories, school-age children, interactive</td>
</tr>
<tr>
<td>Picture book design</td>
<td>Yellow</td>
<td>Picture book design, visual representation</td>
</tr>
<tr>
<td>Picture book creation</td>
<td>Yellow</td>
<td>Picture book creation, childhood memories, dynamic illustration</td>
</tr>
<tr>
<td>Picture book</td>
<td>Green</td>
<td>Picture book</td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th>Topics</th>
<th>Color</th>
<th>Figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children's picture books</td>
<td>Green</td>
<td>#0</td>
</tr>
<tr>
<td>Picture book creation</td>
<td>Yellow</td>
<td>#1</td>
</tr>
<tr>
<td>Picture book</td>
<td>Yellow</td>
<td>#2</td>
</tr>
<tr>
<td>Narrative structure</td>
<td>Green</td>
<td>#3</td>
</tr>
<tr>
<td>Science picture books</td>
<td>Green</td>
<td>#4</td>
</tr>
<tr>
<td>Illustration design</td>
<td>Green and red</td>
<td>#5</td>
</tr>
<tr>
<td>Interactive narrative</td>
<td>Cyan</td>
<td>#6</td>
</tr>
<tr>
<td>Children and adolescents</td>
<td>Purple</td>
<td>#7</td>
</tr>
</tbody>
</table>

Survey Results and Discussions

Keywords related to picture book creation were clustered and resulted in four main themes as shown in Table 2: children’s picture books, picture book design, picture book creation, and picture books. These main themes were further divided into eight sub-themes, as shown in
Table 3: children's picture books, picture book creation, picture books, narrative structure, science picture books, illustration design, interactive narrative, and children and youth. These themes are relevant to the creation of picture books in a Chinese context.

The diagram presents four main themes, represented by green and yellow colors. The remaining colors represent sub-themes. The green main themes "Children's picture books" and "Picture books" include the sub-themes "#0 Children's picture books", "#3 Narrative structure", "#4 Science Picture Books", "#5 Illustration Design", and "#6 Interactive Narrative". The yellow main themes "Illustrated Book Design" and "Illustrated Book Creation" include the sub-themes "#1 Illustrated Book Design" and "#2 Illustrated Book Creation". The cyan cluster includes the sub-theme "#7 Interactive Narratives" and the purple cluster includes the sub-theme "#8 Children and Youth". There is overlap between these clusters, such as the overlap between the yellow #1 illustrated book design and the "#6 Illustration Design".

Cluster 1: Children's Picture Books
The research in this cluster focuses on picture book creation as the main object of study. He and Si (2022) analyze the future of children's picture books from a meta-universe perspective of interaction and explore the characteristics of a new era of children's picture books with immersive narratives. Wang (2018) investigates the effects of children's moods on their drawings, analyzing relevant visual and narrative elements. Song & Liu (2022) proposed a new design idea and direction for the creation of children's picture books based on the five senses theory, namely: sight, sound, touch, taste and smell. Gan & Liu (2022) analysed the potential factors for the development of children's picture books under media convergence, the characteristics, and the strategies for optimizing the interactivity of children's picture books through the integration of multiple carriers and the coordination and linkage of multiple senses. Sheng & Hu (2016) propose a new trend in picture book design in the digital context: close integration with picture book content, integration of age-appropriate digital technology, and establishment of a convergent and innovative design model. Based on this, the author makes the following claims.

Proposal 1a, Children's picture books need to stimulate children's senses with more media in the new context.

Proposition 1a, Children's picture books are in urgent need of improvement in their original creation method or medium in the digital context.

Cluster 2: Picture Book Creation
Most of the authors in this field focus on the interactivity between picture book creation and children. Feng and Li (2021) have studied children's nature education activities, including creative ideas, activity contents, and participation methods, and have summarized design methods for related thematic picture books. From the perspective of interactive experience, Li et al. (2021) combine the theoretical knowledge of the printing process, book design art, child psychology, and child education psychology to sort out new creative thinking for the design of original children's picture books in China. Liu (2020) illustrates the connection and practice of emotional expression and picture book creation from the perspective of emotional expression based on creation. Fang et al. (2020) developed this study's reading comprehension test regarding the PIRLS International Reading Literacy Progress Literacy Test to understand children's reading differences and explore the design of electronic and paper picture books based on the test results.
Proposal 2a, Interactivity is a central issue in the creation of picture books. Proposition 2b, the study of interactivity needs to be in line with the attributes of picture books and the current technological environment.

**Cluster 3: Picture Books**
The picture book is the subject of research on the issue of picture book creation. Various studies on the subject of picture books are centered on this theme. Hu (2013) presents some questions for Chinese creators from the perspective of children's reading psychology and gives a new direction for creation. Yue and Liu (2020) applied NVivo to code the children's interview data and analyzed the values and picture book creation models upheld by Chinese and American creators as the root cause of the differences between Chinese and American picture books. Zhang (2023) completed a summary of the experiences of picture book creation and such creation from the perspective of poetic narrative. Chen (2019) studied the form of children's picture books from the perspective of art psychology and analyzed the current situation of children's picture books in China. Ma (2018) studied emotional education through the process of reading picture books to young children.

Proposal 3a, The psychology of reading, comparative studies, and narrative perspectives are directions of research in the field of picture books. Proposition 3b, Much of the research on picture books is related to the psychological study of readers and authors.

**Cluster 4: Narrative Structure**

Proposal 4a, Narrative structure is a central issue in the creation of picture books.
Proposition 4b, The narrative structure used by the creator is related to the age of the reader, the current level of technology, the different geographical cultures, etc.

Cluster 5: Science Picture Books
As an aspect of picture book creation, science picture books have been a discipline of picture book creation research. Wang (2020) used picture books from a creative perspective to give readers knowledge of plants within the Forbidden City in China, bridging the gap in popular science picture books in terms of knowledge of plants in the Forbidden City. Li (2019) used questionnaires and fieldwork, still from the perspective of picture book creation, to summarize the cultural elements of the Qiao Family Compound and create a popular science picture book to popularize traditional Chinese culture - the Qiao Family Compound. Zhang (2020) conducted a study on the sensory experience of science picture books based on AR technology, making science picture books an immersive experience in terms of technology. Liang & Zou (2021) studied most of the picture books on the market for earthquake and disaster prevention and mitigation and elaborated on new approaches to the creation of such picture books in terms of content expression, disaster scenario restoration, and cross-border application of communication media.

Proposal 6a: One of the main issues with science picture books is the challenge of effectively combining creative methods and various types of knowledge in the creation process.
Proposal 6b: The creation of science-based picture books is a genre direction for picture book creation.

Cluster 6: Illustration Design
Guo (2018) developed his approach to illustration design by studying and analyzing the images of foreign animals in the ancient Chinese text Shan Hai Jing and combining them with modern elements. Zhong (2020) proposed incorporating the visual language of illustrated books in illustration design classes in universities. Liang (2020) identifies the shortcomings of Chinese mythological images in the visual representation of modern illustration and summarizes the elements of illustration design in line with contemporary youth aesthetics and Chinese ethnic characteristics. Xu and Liu (2020) point out the connection between the function of picture book reading and monster-themed illustration design in the context of the concept of categorized reading. Wan (2020) wants to use the visual approach of narrative illustration design to draw attention to the "Democracy Road Historical and Cultural Street in Lianyungang" and investigates the presentation of such illustrations.

Proposal 7a, Illustrations in Chinese picture books are mostly related to the mythological images of the country.
Proposal 7b, Chinese picture books need to find new subjects based on the country's traditional culture.

Cluster 7: Interactive Narratives
Most of the authors in this field are concerned with the issue of interactive narratives of picture books and children. The clustering of digital picture books is the direction of the more forward section of current picture book creation methods, revealing new ways and means that picture book creation may be used in the future. Feng and Li (2021) and others take nature education as the theme, summarize the design ideas, activity contents participation methods and, other characteristics of several typical children's nature education activities, and summarize the design methods and ideas of related thematic picture books. From the
perspective of interactive experience, at the same time, combines the theoretical knowledge of the printing process, book design art, child psychology, and child education psychology to sort out a new creative idea for the design of original children's picture books in China. Liu (2021) illustrates the connection and practice of emotional expression and picture book creation from the perspective of emotional expression based on creativity. Fang et al. (2020) developed a reading comprehension test concerning the PIRLS International Reading Literacy Progress Literacy Test to understand children's reading differences and explore the design of electronic and paper picture books based on the test results. Cao (2019) argued that interactive picture books as an example of exploring the value and principles of playful thinking in picture book design, through the analysis of binding, media, and form. Lan (2020) suggested that interactive picture books should be practiced in terms of dynamic visual and sound elements and interactive settings. Wang (2020) studied the design method, design content, and design features of the interactivity of picture books, giving specific interactive implementation methods. Liu et al. (2019) take AR books as an example, analyze the characteristics of the target users, study the number of interaction nodes, setting timing, interaction methods and interactive content that interactive picture books should have from the perspective of psychology, and summarizes some AR interaction principles. Cao (2018) studies the application of gamification thinking in picture book design.

Proposal 2a, Interactivity is a central issue in the creation of picture books.

Proposal 2b, The study of interactivity needs to be in line with the attributes of picture books and the current technological environment.

Cluster 8: Children And Youth


Proposal 8a, the main group of readers of picture books is children and young people.

Proposal 8b, illustrated books have a definite influence and role in the education of children and young people.

Further Considerations

This study used the CNKI database to collect data for the research, as it is a widely-used and representative database in China and the focus of the study was on Chinese picture book creation. However, it should be noted that this study did not consider literature from other Chinese databases, which may have resulted in certain limitations. The CNKI database includes both Chinese and English papers, but the majority of relevant literature on Chinese picture book creation is published in Chinese. This is because many Chinese scholars hope to improve the creation of Chinese picture books. The author searched foreign databases, such
as Scopus and Web of Science, and found that no research on this topic has been conducted by foreign scholars. This is also a limitation of the study, as all of the research papers used in this study are in Chinese.

Conclusion
Through econometric analysis of the literature on picture book creation in China, the authors identified the current state of research and areas of focus, as well as future research trends. The study found that children's picture books, picture book creation, and picture books themselves are important research topics. Children's picture books are the main focus of picture book creation, as most picture books are for children and young people. The term "creation" refers to the overall picture book, while "picture book design" focuses on a specific aspect of it. Science picture books are a specific category of picture book creation, and researchers in this field are particularly interested in effectively conveying scientific content. Picture book creation is a significant theme, with researchers focusing on issues such as the interactivity of picture books and the incorporation of traditional Chinese culture. Nine themes were identified: Cluster #0 "Children's Picture Books", Cluster #1 "Picture Book Creation", Cluster #2 "Picture Books", Cluster #3 "Narrative Structure", Cluster #4 "Science Picture Books", Cluster #5 "Illustration Design", Cluster #6 "Interactive Narrative", and Cluster #7 "Children and Youth". These themes overlap, with Cluster #6 "Interactive Narrative" being a newer topic emerging from the current technological environment. The remaining themes, Clusters #0 "Children's Picture Books", #1 "Picture Book Creation", #3 "Picture Books", #4 "Narrative Structure", #5 "Science Picture Books", and #6 "Illustration Design", all relate to the study of picture book creation. Cluster #7 "Children and Youth" specifically focuses on the target audience for picture books.

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