

Analysis Of Research Trends Related To Children's Picture Books Using Text Mining

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Abstract

This study aims to examine research trends in the field of children picture books by analyzing academic papers published as keywords of 'child picture books' from 2000 to 2021. The research target papers were 1,216 domestic academic papers collected using the database of academic research information services, and analyzed using a network analysis method using big data. First, as a result of examining the frequency analysis and connection centrality of major keywords in research papers from 2000 to 2021, studies related to picture books, children, and languages were mainly focused. Second, as a result of analyzing the network visualization of research related to children picture books, papers on picture books, languages, and children were mainly conducted in Wordcloud, but studies related to literature, creativity, activities, and education were also found to be high. Third, as a result of analysis with the N-gram network, studies on literature, emotion, and language showed connectivity. As a result of analysis with the CONCOR network, it was classified into eight groups, and picture books and children were calculated as the highest ranking in topic modeling. This study is meaningful in exploring future research topics and directions related to children picture books and providing necessary basic data as it can objectively grasp the relevance between topics and trends of the times in research related to children picture books.

Keywords: early childhood, picture books, text mining, research trends

Introduction

Since the outbreak of COVID-19, individualism has been stronger than community culture, and picture books play a role as playgrounds and friends for children. Children are interested in written language and naturally acquire language through picture books that combine writing and painting. Children experience indirect experiences through picture books and recognize that meaning is conveyed through regular letters in picture books [1]. In the process of looking at picture books and reading pictures, children understand the contents of picture books and improve their ability to interpret the meaning of vocabulary or language contained in the text. Therefore, it can be seen that picture books play an important role in the language development of

children. In addition, picture books improve children's thinking skills because they can expand their meaning by discovering and understanding new meanings in the process of repeatedly reading picture books [2]. As such, it is worth noting that picture books are a playground that children can easily access and enjoy and that they are used as various active media as well as play at home and children education institutions.

Research related to picture books proves the educational value of picture books, and in the 1990s, two or three studies were conducted a year, but it increased to double digits in 2001 and three digits in 2003 [3]. In particular, research on picture books for children has increased

significantly since 2000 [4]. This can be considered in connection with the remarkable achievements [5]. That is called the Renaissance of Korean children's literature from the mid-1990s to around 2000. Since 2010, the number of papers related to picture books has increased rapidly, and the number of thesis papers has increased more than academic journals [3]. The fact that picture book-related studies are continuously published in academic journals and degree papers indirectly proves that picture books support the development of various aspects of children. Therefore, it will be meaningful to look at the trend of picture book research as to what contents research related to picture books are generally conducted in connection with.

In addition, existing research trends have generally been subjectively analyzed by researchers in designing and planning target selection, research timing, and research methods [6]. Therefore, this study aims to study through big data analysis to understand the changes of the times and the flow of central words and contents by setting research related to children's picture books, including academic journals and thesis. Statistical analysis using big data can closely analyze the objective flow of picture book research and the trend of the times.

In recent years, in the field of early childhood education, it can be seen that while paying attention to big data analysis technology, the trend of research related to early childhood picture books is grasped and analyzed in context. Using big data analysis, trend studies examining the relationship with topics related to early childhood education are being conducted on various aspects, focusing on variables related to children, parents, and teachers. This is considered to be interesting in big data analysis in early childhood education because meaningful information different from existing trend studies can be extracted from the results using big data analysis.

Text mining, an analysis method using big data, is one of the types of unstructured data mining, formalizing data from papers, newspapers, and

magazines in various fields, and data results are useful for deriving meaning [7]. In addition, it has the advantage of analyzing large amounts of data in seconds to save time and obtain accurate results, and objective analysis and useful information can be found through various analysis methods different from the analysis of children's picture book research trends studied so far [8].

Therefore, this study aims to collect research related to picture books for children published in academic journals from 2000 to 2021, which rapidly increased the number of papers related to picture books and analyze research trends related to picture books using text mining techniques. Analyzing research trends in early childhood picture books will be able to examine the topics covered in the study, and objectively summarize the relevance between the topics and the trend of the times. In addition, through the research results, the direction of future research can be sought, and it is expected to provide important significance in the academic development of children's picture books.

Research Questions

- what are the results of frequency analysis and connection centrality of major keywords related to picture books?
- What is the connection between concepts in research related to picture books for children?

Research Methodology

The subjects of this study are studies related to children's picture books in academic journals and master's and doctoral theses published in Korea from 2000 to 2021. A total of 1898 papers was collected using the Academic Research Information Service (RISS), but a total of 1,216 papers was analyzed after deleting overlapping papers from academic papers and academic journals, non-children papers, and non-children picture books. In addition, when looking at papers before 2000, one study was published every year in the 1980s, and a total of 72

academic journals and degree papers were published from the 1990s to 2000. In addition, a paper published under the theme of picture books for children and toddlers was first confirmed in 1997 [9]. Because research related to picture books has been actively started since 2000 [3], this study targeted studies published from 2000 to July 2021. From 2000 to 2010, 620 studies were actively conducted, and from 2011 to 2021, it was found that it doubled to 1,206 studies. The annual analysis was divided into 2000-2005, 2006-2010, 2011-2015, and 2016-2021.

For data collection and data purification work related to children picture books, we used the

program of Textom 5.5 version and NetMiner 4.43, developed by The IMC. In addition, UCINET ver. 6.738 was used to find out the relationship between keywords related to children's picture books [10]. The refinement of keywords is the most important process in network analysis of text mining, and the work of calibration, control, and deletion can ensure the clarity and accuracy of keywords [11].

Data Analysis

I. Frequency analysis and connection centrality results for keywords related to picture books for children

Table 1. Keyword Frequency Analysis and Connection Centrality Index (2000-2021)

Word	frequency		Connectivity Centrality		Word	frequency		Connectivity Centrality	
	Ranking	Number	Ranking	Centrality		Ranking	Number	Ranking	Centrality
Picture book	1	1038	1	0.5259	Disorder	16	58	17	0.0644
children	2	468	2	0.2972	Mathematics	17	53	21	0.0582
Language	3	448	3	0.2494	Role play	18	53	18	0.0623
Literature	4	202	4	0.1704	Painting	19	50	14	0.0727
Education	5	150	6	0.1372	Interaction	20	48	26	0.0498
Activity	6	145	5	0.1372	Art	21	45	23	0.0561
Creativity	7	133	8	0.0997	Recognition	22	44	20	0.0623
Emotion	8	100	7	0.1039	Expression	23	40	32	0.0415
Personality	9	83	12	0.0790	Problem Solving	24	38	22	0.0582
Parents	10	81	11	0.0810	Ego	25	37	24	0.0561
Teacher	11	79	9	0.0956	Preparatory teacher	26	36	35	0.0395
Reaction	12	67	16	0.0644	Science	27	35	33	0.0395

Pro-sociality	13	65	13	0.0748	Oneself	28	34	19	0.0623
Program	14	62	10	0.0852	Music	29	33	25	0.0498
multiculturalism	15	59	15	0.0665	Same age group	30	30	29	0.0436

Looking at table 1, The frequency of appearing keywords related to Children’s picture books was in the order of picture books (1038), children (468), languages (448), literature (202), and education (150). It can be seen that many previous studies related to language activities and education have been conducted for infants in relation to picture books. In addition, looking at the connection centrality presented in the table,

similar to the frequency of appearance, it appeared in the order of picture books, children, languages, and literature, still, the frequency of activities was slightly higher than education, resulting in a higher ranking. It can be seen that even if the values of connection centrality are the same, the ranking is objectively and clearly expressed according to the frequency.

II. Network visualization of research related to children picture books

1. Word Cloud for Research on Picture Books for Children

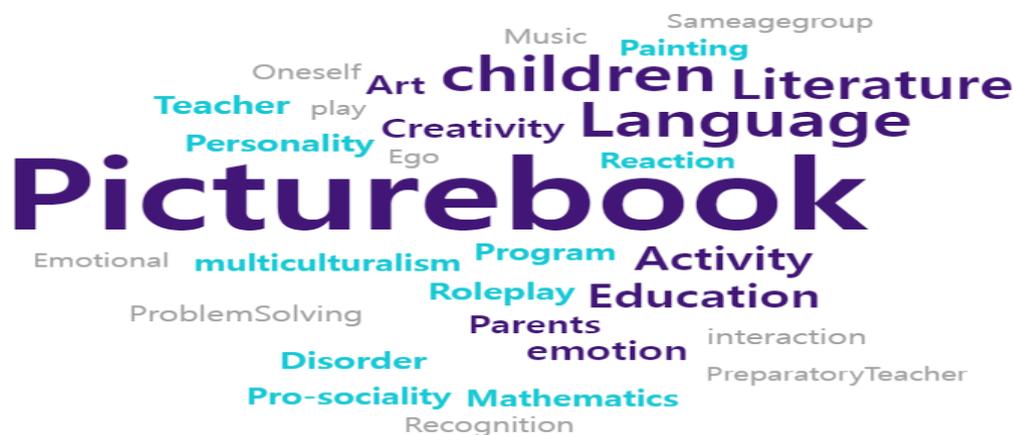


Figure 1. Overall Word Cloud (2000-2021)

Figure 1 shows the whole from 2000 to 2021, picture books, languages, and children

showed the highest frequency, but studies related to literature, creativity, activities, and education were high.

2. N-gram Network

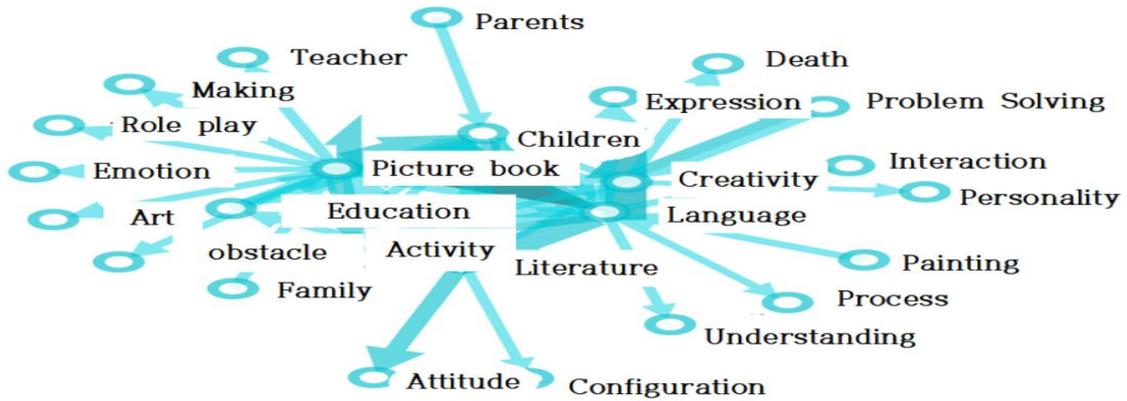


Figure 2. N-gram Network Visualization (2000-2021)

N-gram is connected in bold, focusing on picture books, language, literature, children, and creativity (Figure 2). The higher the frequency,

the thicker the arrow becomes, and the network of keyword frequency can be confirmed by the direction and thickness of the arrow.

3. CONCOR Network Results

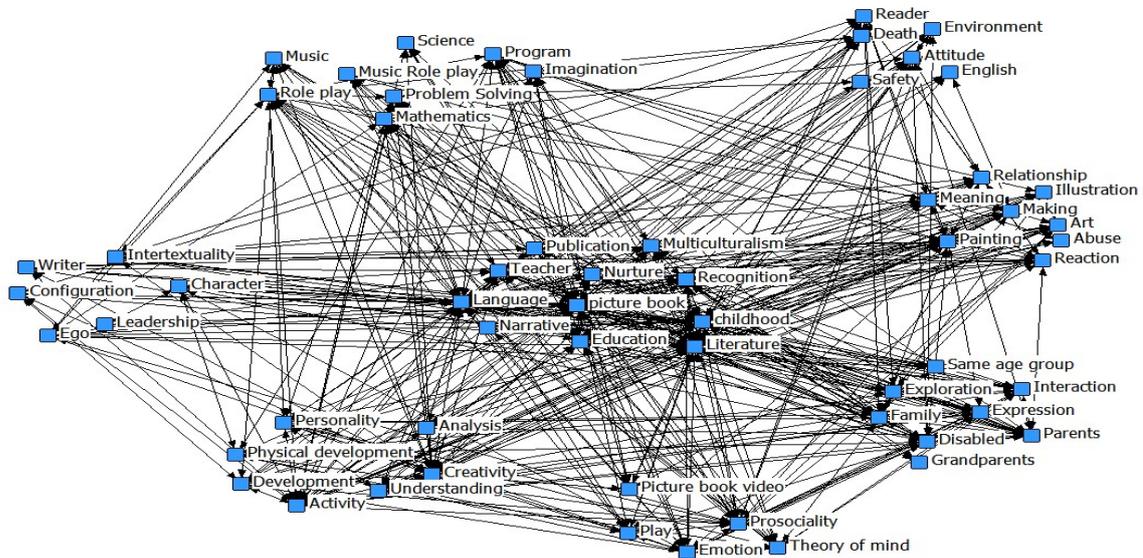


Figure 3. CONCOR Network (2000-2021)

The relationship between groups can be seen in eight groups (Figure 3). The largest group shows that words such as picture books,

languages, children, education, parenting, perception, teachers, and stories are related to each other.

4. Keyword Topic Modeling Results

Table 2. Topic Modeling Results of a Paper on Childhood Picture Books (2000-2021)

NO	Topic	Key Keywords	frequency
1	Picture book	children, language, personality, literature, activity	1038
2	Children	Picture book, language, parents, personality, creativity	468
3	Language	children, literature, activity, personality, picture book	448
4	Literature	Language, education, picture book, creativity, children	202
5	Education	Picture book, literature, personality, children, activity	150
6	Activity	Picture book, language, parents, personality, literature	145
7	Creativity	Picture book, children, activity, art, personality	133
8	Emotion	Picture book, Personality, children, parents, language	100
9	Personality	Picture book, children, activity, language, education	83
10	Parents	activity, Picture book language, personality, children	81

Picture books with the highest rankings for infants have the most research on children, and language, literature, and activities using

Conclusion

From 2000 to 2021, the frequency analysis of the main keywords of research papers related to children's picture books showed that picture books, children's, languages, literature, education, activities, creativity, emotion, personality, and parents were high in the order. However, connection centrality was high in the order of picture books, children, languages, literature, activities, education, emotion, creativity, teachers, and programs, and among the keywords included in the 10th place, keywords of teachers and programs that did not appear in frequency analysis were found. These results show that picture books, children's languages are ranked high because picture books are widely used as educational media to promote language development in early childhood education sites [12].

As a result of examining the relationship between concepts in research related to early childhood picture books, it can be seen that language and

children's picture books would have been centered on language, literature, and activities (Table 2).

children's show the highest frequency in WordCloud, but studies related to literature, creativity, activities, and education are more frequent. As a result of network analysis, N-gram shows that the network structure of keywords is largely connected to language, literature, emotion, and children, and is also connected to multiculturalism, preparatory teachers, disabilities, personality, creativity, activities, and parents. In addition, CONCOR network analysis shows structural connectivity using correlation, and the results of this study show that it is divided into eight groups and shows the relationship between groups. As a result of calculating picture books and children's in topic modeling, it can be seen that picture books have the most research on children's, and they are composed of related words such as language, personality, literature, and activities, so it is judged that language and literary activities using children's picture books are the center.

Suggestions

Since this study examined children, there is a limit to generalizing the research results. Therefore, in future studies, it is expected that

research that can expand the scope of the research subject and analyze the content in detail will be conducted.

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