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# Knowledge Graph Analysis of Science and Technology and Children's Education

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**Abstract:** In this study, 1700 articles related to children and science and technology education published on CNKI) were taken as the research objects, and the visualization software CiteSpace was used to draw the keyword knowledge map, so as to explore the hot research issues of children and science and technology education in China. The results show that the research of children and science and technology education in China basically focuses on the core issues of child education, and the main topics include the relationship between child education and science education, science museum and science and technology, early childhood education and child education. This study will focus on the following aspects, The relationship between science and technology and children's education policies: to explore the government's policy measures in promoting the integration of science and technology and children's education, and the impact of these policies on educational practice. Development and application of science and technology education products: analyze the design concept and functional characteristics of science and technology education products, as well as their application effect in educational practice. Development and innovation of science and technology education enterprises: to study the business model, market competition strategy of science and technology education enterprises, and their exploration in technology innovation and education practice. The knowledge graph analysis of this study will provide a visual tool for understanding the relationship between technology and child education, and will help to provide a useful reference for educational researchers, policy makers and practitioners.

**Keywords:** Science and technology education, education for children, knowledge graph, Interactive learning, online education.

## 1. Introduction

With the rapid development of science and technology, the digital and intelligent education mode has gradually become the mainstream. In the field of children's education, science and technology, as an innovative teaching means, has great potential and broad space for development. As a structured and semi-structured data organization method, the knowledge graph (Knowledge Graph) can provide strong support for the research and practice in the field of education.[1]

This paper aims to explore the interaction and potential relationship between science and technology and children's education through knowledge graph analysis, in order to provide useful enlightenment for research and practice in the field of children's education.[2] Knowledge graph analysis method can help us to better understand the role of science and technology in children's education, and how to use science and technology to improve the quality and effect of education.[3]

This study will be carried out from the following aspects: firstly, review the current application status of science and technology in children's education, and analyze its advantages and disadvantages; secondly, to introduce the basic principles and application methods of knowledge graph and how to build knowledge graph in the field of child education;[4] firstly, show the application effect of knowledge graph in science and technology and child education; finally, summarize the main findings and enlightenment of this research, and look forward to the future research direction.

This study believes that through knowledge graph analysis, we can have a deeper understanding of the relationship between science and technology and child education, and provide strong support for research and practice in the field of education. With the continuous development of science and technology and the continuous change of education mode, the application of knowledge graph in the field of children's education will be more extensive and deep.[5]

## 2. Literature Review

National Knowledge Network of China (CNKI) is a high-level citation database in the field of humanities and social sciences in China, and the journals and papers included in it have good academic representativeness and influence. Therefore, this study will analyze the development of educational technology education in China based on CNKI.

In this study, topics, keywords, and abstracts were various combinations of "children's education", "technology" and "technology", from August 1,1998 to August 1,2023.

In addition, in order to ensure the effectiveness of the selected literature, after the search of the above methods, the study was screened manually and one by one, and articles unrelated to graduate education economics such as conference notice and university introduction were excluded, and a total of 330 documents were obtained.[6]

This study refers to the experience of many existing studies (1), uses CiteSpace software and combines relevant literature keywords to determine research hotspots and trends, and draws knowledge maps, so as to analyze the research dynamics and development trend of graduate education economics. In the specific analysis section, The data processing parameter conditions of this study are set as follows: (1) the time range is from 1998 to 2019, Time partition (Year Per Slice) is set to 1, 22 time zones in total; (2) Node type (Node Types) is set as the keyword (Keyword), This is because the key words of the journal literature can better reveal its research topic and core content; (3) Parameter relationship strength (Strength) is set to "Cosine", Range

(Scope) is set to "Within Slice"; (4) The threshold value (Selection Criteria) is set to "Top 50 per slice", That is, select the top 50 keywords in each time zone; (5) The Pruning parameter is set to Pathfinder, Pruning sliced networks, Pruning the merged network, That is, tailoring the network using a pathfind network algorithm, In the network clustering, The cluster label naming selection TF-IDF algorithm, The named terms clustered are derived from the literature keywords. In order to better analyze the research hotspots in the field of graduate education economics and their migration, this study uses the keyword co-occurrence map, keyword clustering map, keyword time zone map and other maps.[7]

# 3. Research Technique

## 3.1. Search literature

Use databases and academic search engines (such as CNKI, Web of Science, Google Scholar, etc.) to search for relevant keywords, such as "knowledge map", "science and technology education", "children's education", etc.

Read the selected literature and extract the research methods, conclusions and findings related to this study.

Use the literature management software (such as EndNote, Mendeley, etc.) to organize the references for easy citation and management.[8]

## 3.2. Data collection

(1) Collect literature and materials, teaching cases, education policies and other data about science and technology and children's education from authoritative databases, educational websites, policy documents and other sources.

(2) Design the data collection table, identify the data items to be collected, and improve the efficiency of data collection.

## 3.3. Data preprocessing

(1) Use word segmentation tools (e. g., jieba, THULAC, etc.).

(2) Use part of speech marking tools (jiebaba, THULAC., etc.).

(3) Use stopped thesaurus (such as SnowNLP) to remove stopped words and improve the quality of text data.

## 3.4. Knowledge graph construction

(1) Select the appropriate knowledge graph construction methods, such as top-down or bottom-up.

(2) Determine the entities, attributes, and relationships, and build the basic framework of the knowledge graph.

(3) Through naming entity recognition, relationship extraction and other technologies, entities, attributes and relationships are extracted from text data to improve the knowledge graph.[9]

## 3.5. Knowledge graph analysis

(1) Draw concept maps to show the key concepts and their relationships in the field of technology and children's education.

(2) Network analysis is conducted to find out the key nodes and edges in the knowledge graph and reveal the correlation between technology and children's education.

## 3.6. Results and discussion

(1) Present the knowledge graph analysis results, including concept graph, network analysis, etc.

(2) The analysis results were compared with existing studies to discuss the advantages and disadvantages of knowledge mapping technology in the field of child education.

# 4. Conclusion

The field of education should pay more attention to the research and application of knowledge graph technology, and actively promote the popularization of knowledge graph technology in the field of education. Researchers and educational practitioners should work together to jointly explore the innovative application of knowledge mapping technology in the field of education, in order to improve the quality and effectiveness of education.

In the application process of knowledge graph technology, attention should be paid to protecting students' privacy and data security, and relevant laws and regulations should be complied with.

The application of knowledge graph technology in the field of education still needs further research, such as the construction method of knowledge graph suitable for educational scenarios, and the fusion of knowledge graph and educational data.

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