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Research on the Application of Information Technology in Kindergartens in China——Scientific Metro-logical Analysis Based on CNKI Literature

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Abstract: This paper makes bibliometrics analysis on the published papers, periodicals, authors and research hotspots in the field of kindergarten information technology application research from 2001 to 2020 in CNKI database.

1. Introduction

Since the 1990s, a series of major projects and policies and measures have been implemented in China. Since the beginning of the 21st century, information technology has penetrated into all aspects of social life. The state has attached more and more importance to the information construction of schools. The Outline of the National Medium and Long Term Education Reform and Development Plan (2010-2020) issued by the Ministry of Education on July 29, 2010 clearly states: "Information technology has a revolutionary impact on education development and must be highly valued." On April 13, 2018, the Ministry of Education issued the Education Letter

The INFORMATION 2.0 Action Plan makes it clear that the revolutionary impact of information technology on education should be fully stimulated. It emphasizes to promote teachers' application ability of information technology, promote the deep integration of information technology and education and teaching, strengthen the development and service of digital education resources, improve the construction and application level of information learning environment, and improve the information level of education management.These important documents greatly promote the application of information technology in schools.

Kindergarten as a basic education stage in Chinese education, the application of information technology is also imperative. On February 10, 2012, the Ministry of Education issued the "Professional Standards for Kindergarten Teachers (Trial Implementation)" document, in the field of general knowledge in the dimension of professional knowledge, put forward the basic requirements for kindergarten teachers to "have certain modern information technology knowledge." Under the guidance of national policy, the application of information technology in kindergartens has sprung up.

For this reason, this paper takes the literature of "the application of kindergarten information technology" published in the CSSCI database from 2001 to 2020 as the sample, and makes a metro-logical analysis of the academic community, research foundation and research hot spot of the data literature, and analyzes the evolution of the research of the application of kindergarten information

technology in China in the recent twenty years as a whole, in order to provide a clearer and more comprehensive understanding and understanding for the researchers in the future when they need to trace back the research of the application of kindergarten information technology.

2. Data sources and research methods

2.1 Data source and determination

The data are from CNKI China Journal Full-Text Database. The advanced retrieval tools were used to retrieve the papers with the title of "kindergarten" and "information technology").

The search time was set to nearly 20 years (January 1, 2011 to December 31, 2020), after repeating, delete meeting notice, press release and other non-academic literature, and finally get effective literature 761, including 57 fund literature.

2.2 Research methods

This study uses bibliometrics to analyze the basic situation and hotspots of the application of information technology in kindergartens in recent 20 years.

3. Basic information of the research field

3.1 Annual analysis of published articles

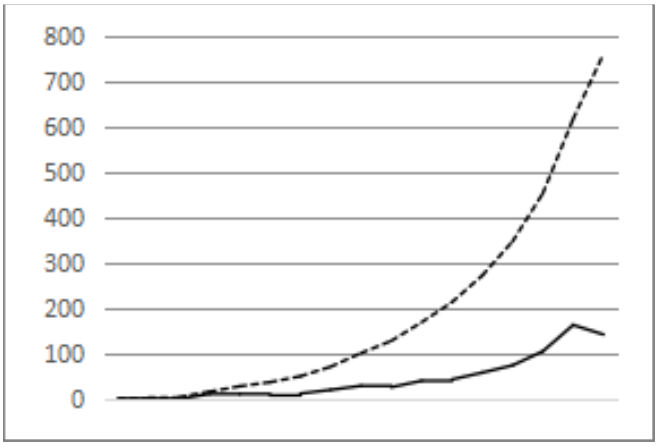

Figure 1: Annual Statistics of Information Technology Application Research Direction of Kindergartens in China in Recent 20 Years

The volume of published articles is the general representation of the degree of attention to a certain field in academic circles, which can reflect the development speed and course of the field to a certain extent. [1]Application Research of Kindergarten Information Technology from 2001 to 2020 in CNKI Database

The total number of related articles published is 761. From FIG. 1。 It can be seen that the annual distribution of published literature fluctuates from 2001 to 2020, but the general trend is upward. The number of articles issued in 2008 was 2; Then it began to rise year by year, peaking in 2019, with 164 articles published; There was a slight decline in 2020, but the number of articles still remained at 143. According to the total amount of published literature on the application of information technology in kindergartens and the trend of increasing year by year, the research on the application of information

technology in kindergartens in preschool education in China will still get the attention of academic circles in the future.

3.2 Analysis of published periodicals

According to the descending order of the published quantity, a summary table of the distribution of periodicals is obtained, as shown in Table 1. Statistical results show that:

761 articles were distributed in 193 journals. Among them, the most published periodicals are Examination Weekly, which contains 36 articles. There are four kinds of articles with more than twenty articles, accounting for 0.81%% of the total number of periodicals, and sixteen kinds of articles with more than ten articles, accounting for 8.3% of the total number of periodicals. See Table 1 for details. The number of articles published in the core journals is 7, from which it can be seen that the quality of the research papers on the application of information technology in kindergartens needs to be improved.

Table 1: Statistics of Published Periodical Sources of ≥10 Published Articles from 2001 to 2021

Periodicals	Number of articles	Ratio	Periodicals	Number of articles	Ratio
Exam Week	36	10.62%	Modern Educational Equipment in China	17	5.01%
New course(Integrated version)	32	9.4%	Chinese juvenile	17	5.01%
Curriculum Education Research	23	6.78%	Weekly Journal	17	5.01%
Information Technology Education in China	22	6.49%	Talent	17	5.01%
Primary science(Teacher Version)	19	5.60%	New course (Upper)	16	4.72%
Contemporary family education	18	5.31%	Scientific public (Science education)	14	4.13%
Educational Information Forum	18	5.31%	Primary and secondary school audio-visual education(Teaching)	12	3.54%
Science fairy tales	17	5.01%	Chinese educational technology equipment	10	3.24%

3.3 Main body analysis

3.3.1 Core author analysis

According to statistical findings, out of 757 samples, a total of 769 authors, of whom 698 wrote as the first author. Prestige Research field of kindergarten information technology in recent 20 years. Jiang Chen, the author of the largest number of five text into the formula. Therefore, the authors with more than or equal to 2 articles can be regarded as the core authors in the field of applied research of kindergarten information technology in this period, totaling 52 persons (as shown in Table 2).

Table 2: Core Authors Based on Price's Law (First author)

Author	Volume	Author	Volume	Author	Volume
Jiang Chen	5	He Lei	2	Wang Yan	2
Liu Guihong	4	He Ying	2	Wu Erna	2
Yu Yun	4	Hercules	2	Wu Yuhua	2
Chen Haiyan	3	Wang Wen	2	Xiong Binghui	2
Gao Yurong	3	Li Abao	2	Wu Hongyu	2
HuangRuping	3	Li Le	2	Xu Chunyan	2
Li Qin	3	Li Na	2	Xu Yan	2
Qian Liqin	3	Liang Jinlan	2	Xu Jing	2
Wang Zhengwei	3	Lin Ying	2	Xue Xiaoqin	2
CAI Yiye	2	Lin Yuanling	2	Yang Yie	2
Cao Liping	2	Liu Aiping	2	Yao Xuedan	2
Chen Yanhua	2	Liu Bing	2	Yu Yingqi	2
Fan Huali	2	Lu Qinfang	2	Yu Xiaoyan	2
Gao Hongyu	2	MA Jinhu	2	Zhang Wei	2
Gao Shan	2	Quan Yichun	2	Zhou Yanping	2
Han Caihong	2	Shi Yan	2	Zhou Yuanzhu	2
He Anke	2	Tang Zhijian	2		
He Jinjing	2	Wang Lin	2		

In addition to the quantity of published articles, the frequency of cited articles is also an important embodiment of the author's influence. [2]According to the statistics, there are 24 first authors whose frequency of quotation is greater than or equal to 12. (As shown in Table 3). Among them, Hao Zhaojie is in the field.The number of cited papers reached 81, indicating that the author has certain influence in the research field.

Table 3: First Author With ≥12 Citations for a Single Document

Author	Year of publication	Quoted frequency	Author	Year of publication	Quoted frequency
Hao Zhaojie	2014	81	Liu Xia	2019	15
Guo Liping	2006	29	Huang Ruping	2016	15
QI Ying	2011	25	Wang Zhengwei	2015	15
Zhang Jing	2010	22	Wanchao	2012	14
Zhang Yongfang	2015	21	Qin Yuju	2018	14
Lu Jixian	2013	19	Dai Lin	2007	13
Jun Guobin	2015	19	Xue Fei	2017	13
Xue Xiaoqin	2017	18	Wanming	2017	13
He Lei	2010	18	Wang Qing	2017	12
Zhao Yaqing	2014	18	Ye Shengjun	2010	12
Liu Guihong	2017	16	Guo Sumin	2011	12
Lin Min	2015	16	Mao Hongmei	2007	12

3.3.2 Coauthoring analysis

Coauthoring papers are the most direct expression of the achievements of scientific research cooperation. The number of coauthoring papers in a period of time can effectively reflect the situation of scientific research cooperation and academic exchange in a certain field. [3]Statistically, 700 out of 757 articles

The articles were signed separately and 41 were co-authored by two authors.Sixteen articles were

published with the cooperation of three or more authors. The overall co-authoring degree was 1.02 and the overall co-authoring rate was 7.53%. These two data reflect an average of 1.02 authors per article.

4. Basic analysis of research

The number of quotation of the research paper is an important indicator of the academic value and influence of the research results. [4] The top 10 most frequently cited papers are shown in Table 4.

From the research content, there are 6 articles related to the integration of information technology and kindergarten education and teaching activities, including integration of art field, integration of language teaching, integration of moral education.Two Text for the Current Situation of Information Technology Application in Kindergarten Check; One article is about the promotion of information technology in homeland co-education. A review of the application of information technology in kindergartens. In fact, some relevant documents after 2015, which reflect the latest policy background and practice environment, also have high academic value, but have not received the attention and praise of the academic circles, reflect that in recent years, heavy-weight research is not common, especially in the application of information technology in kindergarten research results are insufficient reality.

Table 4: Introduction to the Study Direction (Top 10)

Title	First author	Publication year	Journal name	Number of times cited
Analysis on the Application of Information Technology in Kindergarten Teaching Activities	Hao Zhaojie	2014	Research on preschool education	81
Investigation and Analysis on the Application of Information Technology in Kindergartens in Shanghai	Guo Liping	2006	Shanghai Educational Research	29
A Study Report on the Application of Modern Information Technology in the Education and Teaching Activities of Kindergarten Arts	QI Ying	2011	Modern Educational Equipment in China	25
A Summary of the Research on the Application of Information Technology in Kindergartens	Zhang Jing	2010	Teaching Instruments and Experiments	22
Research on Application of Information Technology in Kindergarten	Zhang Yongfang	2015	Off-campus education in China	21
The Application of Modern Information Technology in Kindergarten Language Teaching	Lu Jixian	2013	Scientific public(Science education)	19
A Practical Study on the Integration of Information Technology and Kindergarten Course--A Case Study of Z Kindergarten in Shanghai	Jun Guobin	2015	East China Normal University	19
A New Perspective of Moral Education in Kindergarten under Information Technology Environment	Xue Xiaoqin	2017	Scientific public(Science education)	18
A Practical Study on Using Information Technology to Promote Home Education	He Lei	2010	Education Informationization in China	18
Research on the Current Situation and Countermeasures of the Application of Information Technology in Kindergarten Education--Taking Tianshui City as an Example	Zhao Yaqing	2014	Northwest Normal University	18

5. Analysis of research fund support

Scientific research fund is an important guarantee for the orderly and effective development of academic research, and has a promoting effect on the development of scientific research field. Project funds in a research area can also be reflects the importance attached to a given area by the State and relevant departments at all levels. Through the statistics of the financing of 761 papers, the financing of the paper fund is obtained. The results show that 57 papers are the basis. The
research results supported by the fund and the project account for 7.5% of the published papers in the research field, and the overall fund support is relatively small.

In terms of funding categories, nine papers were funded by national level funds, accounting for 1.18%; Thirty-eight provincial projects, accounting for 4.99%; Five city-level topics remember items, accounting for 0.66%; Five school-level projects, accounting for 0.66%. It can be seen that the fund support level is mainly provincial.

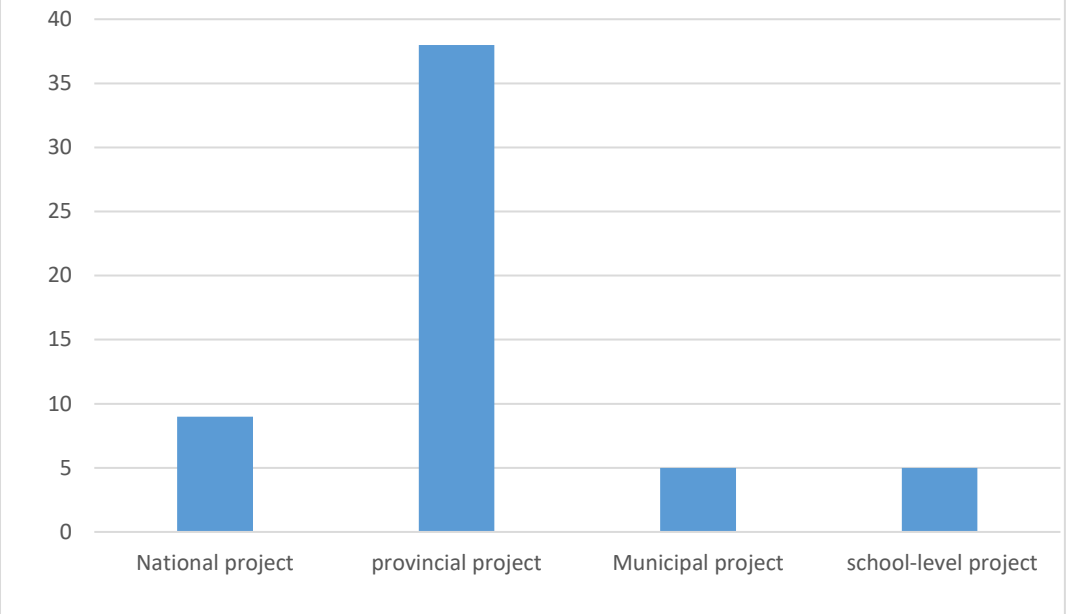

Figure 2: Funding Of Research Papers in This Area

6. Hot spot analysis

Keywords are usually highly refined documents, which can reflect the text features of samples and embody the research hot spots in this field.Based on the statistics of high-frequency keywords in 761 articles on the application of kindergarten information technology, this study explores the research hot spots that scholars pay attention to in this field. According to software statistics, the CNKI database collected 2349 keywords in this field. Most keywords occur less frequently, with 11 keywords occurring 14 or more times (see Table 5). These high-frequency keywords are reflected in the field of research focus in two aspects.

First, kindergarten education, kindergarten teaching, preschool education, preschool learning and other key words show that the application of information technology in kindergarten education and teaching is this field. Among them, language teaching and art activities using information technology are popular research directions. Secondly, the frequency of key words such as multimedia information technology and modern information technology is higher, which indicates that the field is based on the research of information technology in kindergartens.

Table 5: Frequency ≥14 Keywords

Keywords	Frequency	Keywords	Frequency
Information technology	473	Language teaching	24
Kindergarten	321	Teaching activities	20
Modern information technology	89	Early childhood learning	17
Kindergarten education	49	Multimedia information technology	16
Kindergarten teaching	48	Art activities	14
Early childhood education	47		

7. Conclusion

Through the metrological analysis of the research literature on the application of information technology in kindergartens, the author preliminarily understands the general situation of the development of this field: The research on the application of information technology in kindergartens in China began to be more and more active in 2006, and the research content involved is relatively comprehensive, which is integrated with the fields of education, teaching activities and management; There are some research teams, but there are not high-level core research authors and their teams. The quality and attention of the study needs to be improved.

In the practical application process, the kindergarten needs to continuously enrich the connotation requirements of the application of information technology, and continuously implement in the application practice. At the same time, we should find out the problems and deficiencies through self-diagnosis and examination, and penetrate the continuous improvement work into the fields and links of the application of information technology in kindergartens.

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