Comparative Study of Reading Literacy in China and Abroad Based on Bibliometrics Measurements and Visualization

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Abstract: Reading literacy is an important area of interest in reading research. The improvement of reading literacy is not only conducive to the development of personal reading ability, but also an important indicator of the development of reading ability of the whole nationality. Based on the theory and method of knowledge graph bibliometrics, this paper selects the core data of Web of Science core database and Chinese CNKI knowledge network as the basic data, and uses the visual analysis software Citespace to analyze relevant data, through the keyword clustering distribution map, co-cited relationship diagram, subject distribution map, core author distribution map, etc. It elucidates the comparative issues such as hotspots, development trends, research theme and research trends of reading literacy research in China and abroad.

1. Introduction

In an era of rapid technological and economic development, reading is an important way for people to access information. Reading literacy is seen as a national competitiveness. According to the International Reading Literacy Studying (PIRLS), the definition of reading literacy is based on the individual's or social needs, understanding and using written language, constructing the meaning through various forms, through reading subject knowledge and participating in social life.[1] Reading literacy is not only a reflection of the reader's reading knowledge and reading ability, but also a manifestation of readers' reading culture and reading attitude. In the 20th century, the International Student Assessment PISA and the International Reading Literacy Progress Research PIRLS became featured projects to promote reading and evaluation reading ability. The reading of the whole people flourished in North America, Europe, Southeast Asia, etc., and all countries promoted the development of reading literacy. The key to reading, the activities of "National Reading" and "Shuxiang China" initiated by the Central Propaganda Department and the General Administration of Press and Publication and the "Development Plan for the 13th Five-Year Plan for the Whole People" further promoted the reading activities of the whole nation and promoted the depth of reading literacy. The study of reading ability is a hot topic which language learners and researchers have been paying attention to. Excellent reading ability is an important part of language learner's information acquisition and an important part of language ability. With the rapid development of information technology and computer technology widely popular, traditional reading methods and teaching methods relying on books are undergoing rapid changes with the rapid development and popularization of the Internet and mobile terminals. The reading methods of learners are not limited to real books, but more Through modern communication tools such as computers, tablets, and mobile apps, reading methods are pushed to a more autonomous and customized stage. Massive information and data are swam in the ocean of the network and quickly transmitted to every mobile terminal. It makes the knowledge we contact more extensive and more convenient. In the era of digital information digital, what are the new hotspots and branches of reading literacy research? How about the theme of reading literacy research domestically and abroad? What are the similarities and differences between the contexts? In order to more objectively and comprehensively describe the knowledge structure and research context of reading literacy research, this paper uses scientific measurement methods to present the development of reading literacy research at home and abroad, comparing the amount of publications, research topics,

research institutions and Authors' distribution, etc., interpret reading literacy research from a multidimensional perspective.

2. Research methods and data sources

This study uses Citespace, a visualization software developed by Professor Chen Chaomei from Drexel University, USA as a research and analysis tool. As a multi-element, time-sharing and dynamic citation visualization analysis software, it can not only analyze the co-citation of the literature, but also analyze the knowledge clustering and distribution of citation space, the cooperation of authors, institutions, countries and regions.(Li Jie et al. , 2016)[2] On the premise of Citespace analysis data and atlas, combined with qualitative and quantitative research and analysis methods, based on word frequency analysis and co-word analysis, this paper combs the research hotspots, research trends and core authors in the field of reading literacy, in order to present the development, hot spots and context of reading literacy research at home and abroad, compare the amount of papers published over the years, research topics, research institutions and author distribution, and so on.

In order to ensure the authority and representativeness of the analytical data, this paper selects the foreign database Web of Science ((hereinafter referred to as WOS) and the domestic database CNKI as the source database. Both databases are authoritative citation databases for humanities and social science research at home and abroad. In the China knowledge Network CNKI, enter the advanced index, take the papers collected in the core journals and CSSCI journals as the domestic reading literacy search source, reading literacy as the subject word, the time is limited to 1990 to 2017, get 188 documents, delete the book review conference and other unrelated literature, get 18 Six articles. In WOS, the core collection is selected as the source of foreign reading literacy search, and "reading literacy" is used as the subject word, the time is limited from 1990 to 2017. 332 articles are obtained by sorting out and combing. In this study, when running Citespace software, the (Time Slicing) is set to 1 in the time zone of the functional parameter area, that is, each year is selected as a time interval, and the selected time span is 1990 / 2017. Node type (Node Types) selects keywords and topics (term, keywords and category). In this study, Top N =30 was set, that is, the key words of the first 30 of the occurrence frequency were extracted in each time partition as the analysis object, and the irrelevant literature was deleted, and 332 articles were obtained.

3. Research results and analysis

3.1 Comparison of time distribution

The annual issue of the core journals in a field has a reference to the current situation, the stage and the future development of the research in this field. This study has a statistical analysis of the annual release of foreign and domestic core journals in the past two decades. It can be seen from Figure 1 that the reading literacy research at home and abroad has shown a wave-like climbing trend in the past two decades. This phase from 1900 to 2000 is the beginning of reading literacy research. Although the core articles on reading literacy research abroad originated from Bormuth in 1973, JR was called Reading Literacy-Definition and Assessment in Reading Research Quarterly, but there was no relevant research literature until 1990.
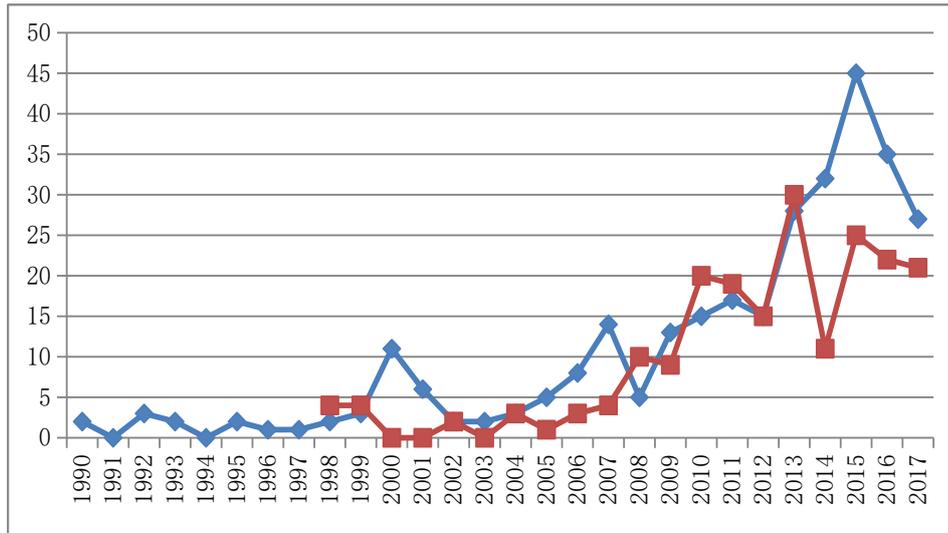
Figure 1 Reading literacy public article number

From the perspective of the increase in the concentration of research literature, 2000 is considered to be a small peak in foreign reading literacy research. The International Student Assessment Program, based on the Student Reading Literacy, Math Literacy and PISA (Program for International Student Assessment), was held for the first time in 2000 and every three years thereafter. Due to the promotion of the International Reading Literacy Progress Research Project PIRLS and the national reading activities, the foreign reading literacy research has continued to grow. The domestic literature on reading literacy is much later than published abroad. In the initial stage of reading literacy, there are only sporadic studies in China. The domestic reading literacy research originated from the introduction and definition of reading literacy, such as the 2003 Review of International Reading Literacy Progress Research and PISA: Definition and Evaluation of Reading Literacy. It is particularly noteworthy that the number of domestic publications on reading literacy research has risen rapidly since 2004. This is the stage in which the Central Propaganda Department, the General Administration of Press and Publication, and the Ministry of Education initiated the "Reading for All" and "School of China". It can be seen that under the advanced concept of studying, absorbing and learning from foreign research, domestic research is also booming. Comparing the trend of domestic and foreign publishing, from 2003 to 2013, it was a rapid growth stage of literacy research at home and abroad. The number of relevant domestic and international publications increased rapidly, from the first five to more than 30.At this stage, both domestic and foreign, the release and implementation of the reading policy of the whole people has played a leading role in the study of reading literacy.

Therefore, the international and domestic reading literacy research high frequency keyword clustering time maps are the following. Among them, the Modularity Q=0.773 in the chart shows that the cluster nodes are closely connected, Mean Silhouette=0.8861. It can be seen that the internal similarity of clusters is high and the correlation is strong.

#0 reading literacy
#1 reading ability
#2 pisa
#3 reading promotion
#4 digital reading
#5 core literacy
#6 the teaching of readding
#7 college students
#8 primiary Chinese
#9 middle-school students
#10 U.S.A.
#11 reading demands
#13 mobile reading
#14 conntation
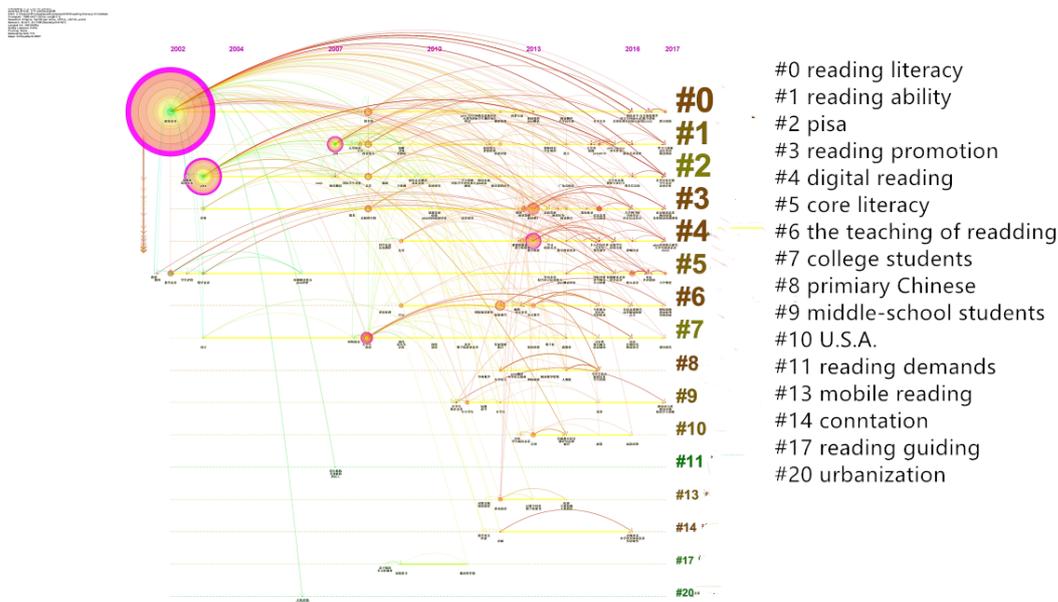#17 reading guiding
#20 urbanization

Figure 2 Chinese high frequency keyword clustering time chart

As shown on the right side of Figure 2, the digital code is a high-frequency keyword clustering analysis of domestic reading literacy research. Reading literacy research has always been the focus of attention, from 2002 to 2017, the origins and foundations of the Center and other research. From the changes in keyword research over the years, it can be seen that the 2003 Pisa study and the 2007 PIRLS study have far-reaching and continuous impact on reading literacy research, and Pisa has become a high-frequency keyword for reading literacy in China. The third largest cluster can be seen by researchers. From a diachronic perspective, domestic digital reading, multimedia reading, and digital reading have become research hotspots as emerging reading methods. Information literacy and information reading literacy have attracted the attention of researchers. The digital reading and mobile reading clustering in keyword clustering indicate that reading literacy in the information age is a new research hotspot. Under the impetus of the theory and practice research of reading literacy research, the reading literacy research for each stage object It is also booming. Demand-based reading teaching and the cultivation of reading literacy at different stages of the subject have become an in-depth discussion by researchers. From the reading of college students after 2007 to the subsequent core literacy, it has become the study of reading literacy theory and practice. The study of domestic reading literacy has experienced more than ten years of development, from the initial introduction of reading literacy theory. And the analysis and learning of reading literacy evaluation project to the absorption, localization practice and research of reading literacy theory, the research of domestic reading literacy is increasing with the development of information in the era, the research of characteristic localization is increasing, and the research direction is also diversified.

Figure 3 Foreign high frequency keyword clustering time chart

Compared with the Chinese reading literacy time map, 20 clusters can be obtained by clustering (see Figure 3) compared with 16 clusters in China (see Figure 2), except for reading literacy, reading ability, digital reading and other similar research hotspots. In addition, foreign reading literacy clusters, such as #1developmental trajectories, #4comprhensive questionnaire, #7sex –typed cognitive abilities, #12class composition effect, and #12class composition effect #15intrinsic motivation (intrinsic motivation) is a concern for the development and research methods of reading literacy assessment. It is worth noting that #11cancer prevention in the cluster of foreign reading literacy is a relatively interdisciplinary research hotspot in reading literacy research hotspots.

3.2 Distribution of subject areas

The development of a research field is inseparable from the development of its basic theory and comprehensive research. In the information age, the research perspective of various theories and interdisciplinary knowledge has made the field of reading literacy a multi-dimensional development trend. From the perspective of psychologists, Reading is a positive process of psychological cognition. The answer to the psychological dimension has made the reading literacy research richer in theoretical support. Among them, there are close relationships with reading, such as linguistics, sociology, book information, communication, etc. There are related articles, compared with the relevant literature data of domestic reading literacy, the study of foreign reading literacy not only has theoretical, teaching research, but also has in-depth development in interdisciplinary, psychology, sociology, computer science, medical care, disease Nursing and other practical aspects have related research. Comparing the literature of domestic reading literacy in subject analysis, domestic research and international research have the common point of reading literacy education. Reading literacy research, especially some reading promotion projects such as Pisa and PIRLS, have promoted the international and domestic reading literacy performance. Not only that, the change of reading style in the information age also provides the direction for researchers, international and Domestically, the publication of information technology is also representative. In contrast, international research has a broader vision, not only in the traditional linguistics, literature, education, but also in social sciences, economics, information and medicine. In the study of international reading literacy, education also occupies more than half of the country. Foreign education and research on the psychological and cognitive orientation of reading literacy is a bright spot. Reading and psychology are inseparable.

4. Comparison of research hotspots and trend distribution

4.1 Keyword frequency analysis

In addition to the annual volume of publications, the distribution of high-frequency keywords in a research field can also reflect the hotspots and dynamics of the field. The research hotspots refer to a group of documents that have intrinsic connections and relatively frequent occurrences in a specific period.[3] According to the co-occurrence clustering and co-word frequency analysis method of scientific measurement, the distribution of keywords or subject words in the core content of the literature extracted from the literature information can reflect the dynamics, research hotspots and development trends of the research field. .The results of the co-word analysis make it easier for researchers to understand and analyze the topics in the field of study.[4] Based on the data on the relevant reading literacy collected in WOS and CNKI above, Cite space software was run to obtain a keyword clustering knowledge map of international and domestic reading literacy studies from 1990 to 2017.(See Figure 4 and Figure 5.) Chinese reading literacy Figure 4 has 471 keyword nodes with a total of 1185 connections and a density of 0.0107.Foreign reading literacy map 5 has a total of 1084 keyword nodes, a total of 3569 connections, the density is 0.0061.

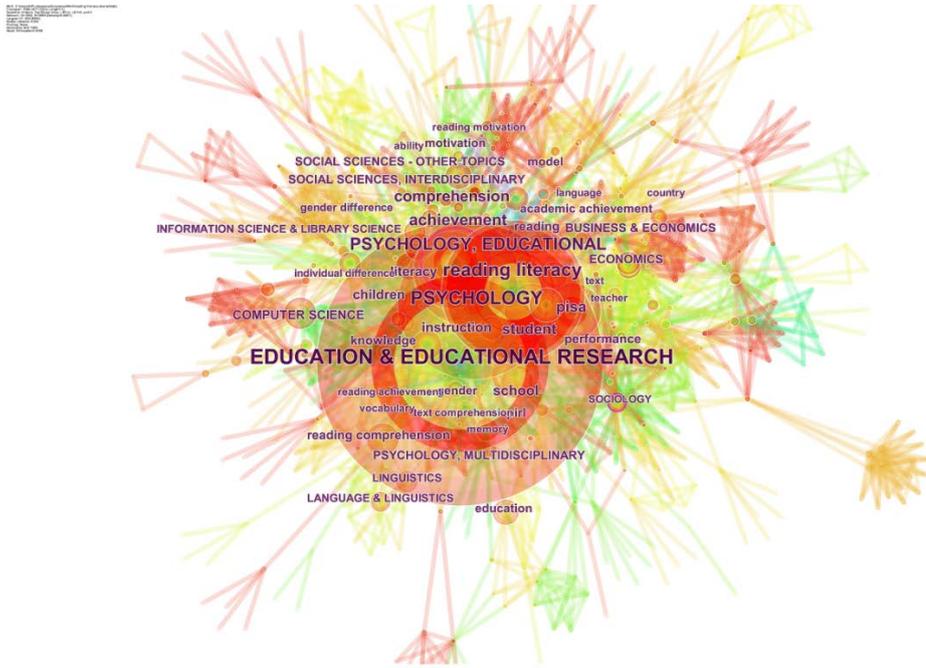Figure 4 Chinese reading literacy keyword co-occurrence map

Figure 5 Foreign reading literacy keyword co-occurrence map

Compared with the co-occurrence map of reading literacy keywords at home and abroad, we can see that there are obvious natural clusters. Each natural cluster has a dominant color, and the visible time is more concentrated. There are important nodes in both domestic and foreign countries, and there are nodes with high circumstance with purple outer circle, such as domestic reading literacy, Pisa, PIRLS, reading promotion and digital reading. There are obvious red rings in foreign maps, such as education & educational research, psychology, psychology education and Pisa. The size of the circle in the knowledge map is related to the frequency of occurrence of the keyword. The larger the circle, the more frequencies the keyword appears. The larger the font of the keyword, the stronger its centrality, and the greater the probability that the keyword will co-occur with other keywords.[5][P58] From the map, you can visually see the reading literacy as the keyword of the largest font, and the largest font for foreign keywords is education & educational research. From the clustering in the clustering time map (see figure and figure), the hotspots of reading literacy research at home and abroad can be divided into the following parts: The first part is in the theoretical basis of research: reading literacy research at home and abroad Hotspots include reading literacy, Pisa, PIRLS and digital reading, computer science. Both Pisa and PIRLS have always played an important role in the reading activities of the whole people. From the introduction of the definition of reading literacy to the test and feedback of global reading literacy of each country, it has a profound impact on reading literacy research. The emergence of digital reading and computer information is inseparable from the advent of the digital information age. The second part is in the classification of the research: the domestic high-frequency core words 75% around the reading and literacy of the two types of words, from the academic point of view is the study of the ontology of reading. The foreign high-frequency core words are more detailed than education and reading. The involvement of interdisciplinary keywords in psychology and natural sciences indicates the diversity of research hotspots. The third aspect is research direction: its teaching research and psychology teaching research in reading literacy is its two biggest hotspots. The arrangement of this research hotspot can indicate that more attention is paid to specific practical content in foreign research directions. The top three hotspots of domestic research are the focus on theoretical testing and theory itself. The fourth aspect of the research object: domestic high-frequency keywords for college students, libraries, book promotion, the United States, Chinese teaching and foreign countries for students and children. Chinese teaching is also a hot spot and characteristic of domestic reading literacy, and it is a manifestation of the growth of reading literacy localization

research. The domestic reading literacy research center corresponds to the keyword frequency, and the centrality of reading literacy reaches 0.99.The foreign countries are not related. It can be seen that the research hotspots of domestic reading literacy are concentrated, while foreign countries are in multiple directions, and multiple research hotspots coexist.

4.2 Sudden analysis

When running cite space, this paper has made a surprise test of reading literacy at home and abroad. By clicking Burstness, Refresh and View, we found that there is no obvious burst in the domestic reading literacy keyword clustering time map (see Figure 4). Sexual nodes, that is, no red circle points, and the foreign reading literacy keyword clustering time map (see Figure 5) has obvious prominence. The frontier analysis based on knowledge map needs to be combined with emergent words, emerging literature and citing literature for comprehensive judgment.[6][P62] After the probabilistic detection, the following 10 sets of the most prominent research frontier topics can be obtained. Visible psychology, psychology education, reading motivation, Pisa, education, educational research, achievement, reading literacy, social science interdisciplinary Natural science interdisciplinary) is the forefront of foreign research. From the time distribution of its salience, it can be seen that Pisa is a turning point in the study of foreign reading literacy. Before 2013, the words of the front of reading literacy research were related to psychological research education, and then especially the five words emerging in 2014. It is the most prominent word.

4.3 Research core authors and research institutions distribution comparison

The core authors within the discipline are scholars with outstanding contributions and influence in the field of academic research. The core author group is one of the important factors for academic innovation and development. Effectively measuring the core authors of the disciplines, mining and analyzing relevant academic research activities is conducive to promoting the establishment of academic discourse systems and effectively identifying the research status and development of different disciplines.[7] In bibliometrics, the two indicators of the core authors are the amount of publications for quantitative analysis and the amount of citations for qualitative analysis. According to Price's law, it is determined by the author of the research field whether it is a core author or a high-yield author. The calculation formula is M=0.749 (Nmax), and the calculation M=3.265. According to the author of the four-part paper that takes 4 integers, the author is the core author of the research field or the high-yield work. The high-yielding writer of domestic reading literacy is Zhang Shuai. Song Naiqing, Wei Xiaona and Li Ziyun.The high-yielding writers of foreign reading literacy are TSE SK, BECKE M, MCELVANY N, ARTELT C, VIDAL-ABARCA E, WU JY, LAM JWI, ROSEN M, VERHOEVEN L, WILDOVA R, ALIVERNINI F, LOH EKY, MYRBERGE and PECJAK. Author. There are two high-yielding authors in China, Song Naiqing and Wei Xiaona, both from Southwest University, all focusing on reading literacy research in basic education. The other two are coming to Beijing Normal University and Jiangsu Normal University, all of which are university research institutions. Among the high-yielding authors abroad, TSE, ShekKam (Xie Xijin), who works at the University of Hong Kong, published 8 reading literacy articles. The research topics of the thesis are mostly related to the reading ability of children in the basic education stage in Hong Kong. German Max Planck Institute Becker, Michael and McElvany, Nele have published several reading literacy articles. Artelt, C of the University of Bamberg, Germany, WU JY of the National Chiao Tung University of Taipei and Lam, JWI of the University of Hong Kong, Rosen of the University of Gothenburg, Switzerland, and Verhoeven, L of the University of Tilburg, the Netherlands, published five related articles. Italian National Institute of Education Alivernini, F and Ljubljana University Pecjak, et al published four related literature.

In addition to the quantified indicator of the volume of publications, the co-citation relationship of the literature is also an important criterion for defining the core author. The citation rate of academic literature reflects the influence of academic papers and the attention of peer researchers. It can be seen from the above two tables at home and abroad that there are crosses between core authors and high-yield authors at home and abroad. Foreign core authors cooperate more than domestic ones. Core authors are also more diverse in terms of subject distribution. Comparing the

units and disciplines of high-yield authors at home and abroad, both foreign and domestic universities and colleges are important bases for reading literacy research. Most of the high-yielding authors come from the fields of education and psychology, focusing on the basic research areas of reading literacy. From the authors of domestic and foreign authors, international high-yield authors have written more and more documents. It is more common from the same research institution or cooperative research. Domestic authors co-exist with separate articles and cooperation.

5. Conclusions and recommendations

5.1 Domestic and foreign reading literacy research flourishes

By comparing the comparative analysis of scientific metrics between 1990 and 2017 at home and abroad, it is not difficult to find that reading literacy research at home and abroad has been in a booming stage for nearly two decades. From the reading volume of reading literacy research at home and abroad, the clustering time chart of keywords, etc. It is not difficult to see that under the era of reading for all, the research on reading literacy at home and abroad has certain knowledge systems and subject research. Team, research tends to flourish.

5.2 Differences in the focus of reading literacy research at home and abroad

Reading literacy research at home and abroad is derived from the ontology of reading literacy and research based on international test projects such as PISA and PIRLS. The application of cross-disciplinary knowledge in the field of basic education is the common point of reading literacy research at home and abroad. International reading literacy research is more interdisciplinary and comprehensive in terms of the proportion of disciplinary distribution of papers. From the frontiers and hotspots of research, international reading focuses on psychological education, humanities, economics and other research topics, including the research and development of basic theories, as well as the use of theoretical frontier research, compared to domestic reading literacy. The research center mainly focuses on "reading literacy", "reading promotion", "digital reading", etc. The depth and influence of domestic research is not as good as international research. Not only that, the domestic reading literacy papers are mostly published in basic education journals and comprehensive humanities journals, such as "Language Construction", "Primary and Secondary School Teaching" and "Shanghai Education Research". In addition to the articles on the introduction and analysis of various reading literacy evaluation projects, there are few articles on the successful practice of foreign reading literacy and the comparison of domestic and foreign practice. Columns on the format of research on reading literacy in domestic related journals are also rare.

5.3 Suggestions

In the era of reading for all, reading ability is national strength and competitiveness. Reading literacy plays an important role in improving the reading level of the whole people and leads the direction of basic education reform. From the perspective of scientific research, reading literacy research is conducive to learning the reading evaluation and reading teaching success experience under international reading literacy in comparison, not blindly, and has targeted learning, absorption and innovation. From the perspective of publishing library management, how to study library reading and library management, reading and publishing from the perspective of reading literacy is a question worthy of further consideration.

From the aspect of reading literacy to the change in family reading, the introduction of reading literacy makes people gradually understand and familiar with reading concepts such as reading aloud, reading with affection, reading in grades, and spelling. The glyph meaning of Chinese characters in Chinese and the origin of Chinese characters are popular. The rise of Chinese traditional culture reading is not only a simple Chinese fever, but also a localized expression of reading literacy research under the promotion of reading and reading literacy. How to introduce the mature experience of reading literacy more comprehensively, strengthen international exchanges

and cooperation, and let the reading literacy research not only flourish in the stage of basic education, but the whole society will attract more attention and it is worth the effort in the future.

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