

## Research Hot Spots and Trend Analysis of International Second Language Writing based on Citespace

Qiuyue Xu

School of Translation Studies

Shandong University

Shandong, China

### Abstract

*Second language writing is a hot topic in the field of second language acquisition. This paper takes 1107 journal papers about second language writing, from 1990-2019 on Web of Science as research object, adopts biblio-metric method, co-occurrence analysis and strategic diagram as main research methods, and applies the information visualization software CiteSpace, to reveal research hot spots and development trend of second language writing. It found that the research of second language writing presented the following features: As for time, the research began to emerge centrally in 2012, and entered the stage of large-scale development in 2015-2019. From the view of space, there are few cooperative studies among countries. As for content, the hot spots are "Performance", "Internal Consistency", "Validation", etc. The further summary and reflection were given, in order to provide reference for deep study of second language writing.*

**Keywords:** second language writing; hot spot; trend; CiteSpace

### 1. Introduction

Compared with domestic research on second language writing, international research on second language writing is relatively cutting-edge. It has formed its own theoretical system, research objects, research methods and research team, and gradually developed into an independent discipline with a clear research scope (Kroll B, 2003). In recent years, the international second language writing research has developed rapidly with unprecedented prosperity. Firstly, the research team has been expanding, and a number of experts have appeared who are specialized in the research of second language writing. Secondly, all kinds of academic research activities are unprecedentedly active. Thirdly, the research results and papers have been published continuously, and many monographs on second language writing teaching have been published, covering a wide range of topics. The analysis of the research hot spots of international second language writing is helpful to grasp the development direction of the research on second language writing and has great enlightening effect on domestic scholars.

Wang Wenyu et al.,(2004) reviewed the empirical research results on second language writing in China in the past ten years, including the phenomena of native thinking in second language writing, the discourse characteristics of second language writing, the language characteristics of second language writing, the factors affecting second language writing ability, the teaching of second language writing and the second language writing test. Besides, the topics in the field of second language writing were analyzed and the direction for future research on second language writing was pointed out as well. Wang Lifei et al., (2005) made a brief review of the status and the development of the international second language writing research, and, at the same time, reviewed the problem of the current hot topics in the study of second language writing and called on scholars to strengthen the importance of foreign language context or background in second language writing research.

To sum up, at present, there are few literature using quantitative analysis of international second language writing research hot spots. At present, the visualization mapping technology of scientific knowledge is emerging in the world to

deeply explore data, so as to objectively, directly and vividly display research hot spots in a certain field (Zhang Lingzhi, 2012).

Therefore, this study adopts the method of biblio-metrics and visualization mapping to conduct a multi-level research on the retrieved foreign second language writing literature. The CiteSpace knowledge map is used to make a visual analysis of the literature related to second language writing and to explore the development of the research on second language writing in foreign countries in the past 30 years. This paper analyzes the knowledge map of second language writing research institutions, author distribution, hot topics and so on, in order to provide suggestions and references for the further research on second language writing in China.

## **2. Research Plan**

### **2.1 Research Tool**

CiteSpace is an information visualization tool developed by Professor Chen Chaomei of Drexel University in the United States, which is specially used for academic literature analysis and suitable for multiple, time sharing, dynamic analysis of complex network. It can detect the hot spots, theme and its evolution in the field of a certain subject and now has been widely used in detecting and analyzing the trend and frontier of academic research, the relationship between research frontier and knowledge base, and the relationship between different research frontiers. As an important part and essence of academic papers, keywords co-occurrence can reflect the research hot spots and frontiers of a certain field sharply and directly (Yan Shouxuan et al., 2014)

The specific steps of CiteSpace in analyzing research on second language writing are as follows: Convert the literature exported from WoS into data formats recognized by CiteSpace with the data format conversion tool provided by CiteSpace. The time span is set from 1990 to 2019 with an interval of 3 years. The thresholds (C, CC, and CCV; C is the citation frequency of the literature, CC is the co-citation frequency of the literature, and CCV is the co-citation coefficient of the literature) were set as (2, 3, 15; 3, 3, 20; 3, 3, 20); The final analysis map is presented by Cluster View-static and Show Merged Network.

### **2.2 Data Sources**

The research mainly focuses on the analysis of word frequency, clustering and hot spots of the key words in international second language writing literature. Before analysis, filtering and screening should be carried out on the key words in the original literature data. In this study, all the literature in the core journals of WoS are taken as the retrieval database. The retrieval type is “advanced retrieval” and the time period is from 1990 to 2019. Taking “(TS= SECOND LANGUAGE WRITING AND TS=VALIDITY AND TS=RELIABILITY) AND LANGUAGE = English AND LITERATURE =Article” as the retrieval formula, a total of 1118 related literature is retrieved. Through manual screening, reports, meeting notices, documents, and so on are eliminated, and a total of 1107 valid literature are obtained, including author, title, abstract, key words, author units, references and other fields.

## **3. Co-occurrence Analysis**

### **3.1 The Co-occurrence Map of Keywords**

From the perspective of knowledge theory, the key words with high degree of centrality and high frequency represent the common concern of researchers in a period of time, i.e., the research hot spots (Small, H., 1986). As a measure of the power of a node, centrality reflects the importance of that point in the network.

The higher the co-occurrence frequency of keywords and the higher the centrality of nodes, the more important the

node is in this field. As Table 3.1 shows, the words with high frequency in the international research literature include “Performance”, “Internal Consistency”, “Validation”, “Student” and “Psychometric Property”, etc., which reflect the focus and changes in the promotion and development of the research in second language writing. From the perspective of centrality, the centrality of “Skill”, “Performance”, “Content Validity”, “Assessment” and “Competence” ranked in the top 5, reflecting that current second language writing research focuses on skills, abilities and performance, writing evaluation and content validity, providing reference and inspiration for the hot spots of domestic second language research. From the time when the keywords first appeared, “Factor Analysis”, “Students”, “Children” were early-appeared keywords. Compared with the keywords which appeared later, it’s not hard to find that, in the early part of the international second language writing research, studies have tended to assessment and the analysis of the factors influencing the score, and the object of study focused on students and children. From 1999, the research began to focus on the differences in competence and performance, i.e., whether the test evaluation can accurately reflect the ability of the candidates. At the same time, “Validation”, “Internal Consistency”, “Test-retest Reliability”, and “Content Validity” appeared. Thus it can be seen that the research on international second language writing has gradually formed a more complete empirical research method and developed into a more systematic research system.

The keyword clustering function of CiteSpace can clarify the hot spots and development trends of a certain research field (Duan Chunyu, 2016). In the knowledge map, Circle represents a keyword node, and the larger the Circle is, the more frequently the corresponding topic appears. The color and thickness of the node tree ring represent the occurrence period, that is, the thicker the inner color ring, the higher the occurrence frequency is in the corresponding year. The second language writing literature data downloaded by WoS was processed with 3-year segmentation, and a keyword co-occurrence map was formed, as shown in figure 3.1:

According to Figure 3.1, there are 307 nodes, 530 links, and the network density is 0.011. The structure of keyword co-occurrence network have been greatly optimized and improved since 2000, but the overall structure of keyword co-occurrence network is still loose and not high in density. In the future, relevant researchers and relevant research institutions should be required to strengthen scientific research cooperation. At the same time, it is also necessary to keep enough concentration and depth on the research topic, and choose appropriate topic to carry out precise and in-depth research, so as to avoid being too shallow.

### **3.2 The Co-occurrence Map of Authors**

This Figure presents statistics on papers published by international scholars in the field of second language writing. In the co-occurrence map of authors generated by CiteSpace, a total of 34 authors and 19 lines between them were selected, with a density of 0.0339, as shown in Figure 3.2. It can be seen that scholars in the field of second language writing have little cooperation and the researches are scattered. In addition, as shown in the figure, the cooperation among scholars mainly focuses on the cooperation framework between JERRY G BLAIVAS, YAEL FOGEL, WJ COSTER and FRANKLIN DEXTER. Among them, WJ COSTER is the most prominent and has the most extensive cooperation scope. WJ COSTER is a professor at Sargent College of Boston University, who has conducted in-depth research in the field of second language writing. YOON SOO PARK is a professor of Harvard Medical School who has published the most papers. It can be seen from his research that second language writing is also closely related to medicine and neurology.

### **3.3 The Co-occurrence Map of Institutions**

In order to find out the core academic teams and institutions of international second language writing research, this study collected the papers published by various research institutions on the second language writing, among which the high-yielding institutions are shown in Figure 3.3 (1). Figure 3.3 (1) shows that Univ British Columbia, Univ Toronto,

Univ Sydney and UCL occupy the top four positions in terms of publication volume by a large margin, indicating that these four institutions have strong research potential in the field of second language writing. The number of papers published by the top 20 institutions is all over 6 papers, which shows that the research on international second language writing has been widely concerned by multiple teams and organizations.

In order to investigate the cooperation between different institutions, an institutional cooperation map for big data research in education was generated, as shown in Figure 3.3 (2). The node is the name of the institution, the size of the node represents the amount of publication, and the node ring represents the year. In co-occurrence map, the label font size represents the centrality, and the line describes the cooperation of the institution (Zhang Zishi, 2015). Similar to the author's cooperation, there are 107 nodes and 68 links in the institutional cooperation network, and the overall density of the network is only 0.012, indicating that the research community of international second language writing is scattered. There is little cooperation between authors from different institutions, and a cohesive research community has not yet been formed.

### 3.4 The Co-occurrence Map of Nations

In the co-occurrence map generated by CiteSpace, a total of 34 countries and 33 links between them were selected, with a density of 0.05, as shown in Figure 3.4:

According to the co-occurrence map, from the perspective of research among countries, the United States is the first country to start the research on second language writing, and also the country that has participated in the most researches. Britain, Canada, the Netherlands, Australia followed, have began to participate in the second language writing research since 2000. The second language writing research in China starts relatively late, and the participation rate is low. From the perspective of national cooperation, the United States does not have research cooperation with other countries. Although Canada, the Netherlands, the United Kingdom, Australia and other countries started late, they have extensive research cooperation among countries.

## 4. Strategic Diagram

Strategic Diagram was proposed by John Law in 1988. Based on cluster analysis, Strategic Diagram is used to analyze the internal connection and mutual influence of a certain research field, and further analyze the structure and development changes of research hot spots in a certain field.

In this paper, there are 307 keywords in total. Through screening, there are 48 clusters, and the clusters with the number of keywords greater than 2 and less than 10 are retained. In the end, a total of 37 clusters are obtained.

By observing Table 4, we find that in the past three decades, international studies on second language writing have been conducted mainly from several aspects. Firstly, the research objects of second language writing include medical students, language students, students of other majors, children, adults, etc. Secondly, the research mainly focuses on factors influencing second language writing performance, such as the influence of attitude on second language writing,

The relationship between gender and second language writing performance, the relationship between students' emotion and second language writing, empirical research on factors influencing second language writing, etc. Thirdly, education of second language writing is also a hot topic, including medical second language writing test and education, second language writing cognition, second language writing test, second language thesis writing. The fourth is the evaluation of second language writing, such as the evaluation methods of second language writing, the self-evaluation of second language writing, the evaluation of second language writing in specific texts, the factors influencing the score of second language writing, etc.

Based on the co-occurrence matrix and clustering of keywords, strategic diagram shows the quadrant position relationship of clustering in plane coordinates in a visual form, and describe the quadrant structure and change of research topic according to the change of quadrant position of each cluster. In this paper, a pair of indicators of novelty and attention is selected, with novelty on the vertical axis and attention on the horizontal axis. A key word strategic coordinate chart is drawn, as shown in Figure 4:

In the first quadrant, there is only cluster 38, namely, second language writing education, which is of a high degree of attention and novelty, indicating that this cluster is closely related to other research topics of second language writing and has attracted the attention of many scholars. Moreover, its novelty is relatively high, indicating that it is currently in the initial stage of research. It shows that the education of second language writing has been the focus and core of the second language writing research in the past 30 years. In recent years, it has been paid more attention to as one of the research topics. The research on the second language writing education is conducive to promoting the students' second language writing ability, seeking for better methods of the second language writing education and curriculum, and promoting the smooth progress of the second language teaching.

The second quadrant contains the most clustering. The clustering in this quadrant is of low attention but high novelty, which belongs to the potential research field of second language writing. The quadrant of the clustering mainly includes the relationship between mother tongue and second language writing, second language writing test, the empirical research on second language writing, the relationship between gender and second language writing performance, etc., thus it can be seen that, at present, scholars pay little attention to the test of second language writing and the influencing factors of second language writing. However, this kind of research is highly novel and has great development space and potential for further research in the future. At the same time, it also provides us with enlightenment in terms of research methods. At present, the research methods for second language writing are relatively single, lacking the support of empirical research. In the future, the optimization and innovation of research methods for second language writing are also worthy of in-depth consideration by domestic scholars.

The third quadrant also includes some clustering, and clustering in this quadrant has low attention and novelty, such as evaluation of specific text in second language writing, factors affecting reliability and validity, etc. However, we cannot deny its research value. If the clustering in this quadrant is screened by appropriate methods, the topic with research value may also be obtained.

The fourth quadrant clustering belongs to the basic type, including second language writing evaluation method, the influence factors of second language writing performance, second language writing ability assessment, etc. This kind of research has a solid theoretical framework, with high attention but relatively lower novelty. If it is chosen as the research subject, it is not highly innovative, and it is difficult to realize the theoretical innovation.

## **5. Research Conclusions and Thinking**

### **5.1 Research Conclusions**

In this study, by using CiteSpace software, different levels of analysis and visualization research were carried out on the maps and related data generated by literature related to second language writing in WoS core database from 1990 to 2019, and the research reached the following conclusions:

#### **5.1.1 The Co-occurrence Map of Keywords**

Research on second language writing is of great value. In the 1990s, studies on second language writing began to appear. In the early 21st century, the research gradually systematized, and began to centrally emerge in 2012. The

number of international research results on second language writing is abundant and the overall trend is increasing.

From the research hot spots, the keyword frequency of “Performance”, “Internal Consistency”, “Validation”, “Student”, “Psychometric Property” is the highest. It can be seen that the research hot spots of second language writing focuses on these fields, but the network structure of keyword co-occurrence is relatively loose and low in density. In the future, researchers need to keep the research topic, research content and research direction in depth and raise attention. From the perspective of research development, the scholars’ attention changed from the early hot topics, such as scoring consistency and the factors influencing the score, to the later research on the assessment validity and content validity of second language writing.

It confirms the development of international second language writing research and also shows the progress of second language writing evaluation. In addition, the high-frequency keywords such as “Psychometric Property” and “Quality of Life” reflect the close relationship between second language writing and other disciplines such as medicine and psychology, which is conducive to the development of interdisciplinary research and the development of interdisciplinary and interdisciplinary cooperation.

#### 5.1.2 The Co-occurrence Map of Authors

The researchers engaged in the study of second language writing are scattered, their main research fields are less overlapping, and the cooperation mode is mostly the radiation cooperation with a single scholar as the center. In addition, the researchers are mainly professors and scholars in the fields of linguistics and medicine. In the future, they need to be guided to promote the development of interdisciplinary subjects and make the research on the internal mechanism of second language writing more in-depth and more systematic.

#### 5.1.3 The Co-occurrence Map of Institutions

There are many institutions involved in the research of second language writing, and the number of scientific researchers is constantly expanding, showing a trend of “a hundred schools of thought contend and a hundred flowers blossom”. However, there is still a lack of sufficient influential scientific research institutions and leaders, and existing research institutions have their own clusters with less cooperation. In the future, macro guidance is needed to establish a long-term guarantee mechanism to ensure the research attention between scientific research institutions and authors, form the mainstream research direction, and promote the virtuous cycle of second language writing research.

#### 5.1.4 The Co-occurrence Map of Nations

There are many countries participating in the study of second language writing, and the international attention to the study of second language writing is increasing year by year. The United States as the leading position in the field of second language writing research, need to strengthen the academic exchanges between other countries as far as possible. As a country with a late start in second language writing research, Chinese scholars should adopt a more open and win-win attitude, communicate more with international scholars, and participate more in the international research on second language writing, so as to make the research on second language writing more international and systematic.

#### 5.1.5 Strategic Diagram

The existing research on second language writing in China focuses on the text level and discusses more about the discourse and language characteristics of the composition. Through the analysis of the research hot spots and trends of second language writing in the world, it can be found that the research on second language writing has great space for innovation and optimization in terms of methods. Second language writing assessment is also the theme of high novelty. Domestic scholars Yang Jingqing (1996) has been proposed for writing score feedback mechanisms, but not enough

in-depth study in the late. In addition, the research on the influence factors for second language writing and second language writing test is in the initial stage, and have large development space.

## **5.2 Research Thinking**

Domestic research on second language writing began in recent years, and the current theoretical and practical research is in the initial stage of development, and lags behind that of foreign research (Ma Guanghui, 1999). This study not only discussed the research hot spots and trends, but also triggered some thoughts: Most domestic references are based on the reference and development of foreign existing results, and the models or theoretical basis established by domestic scholars are not perfect enough. In addition, most domestic studies on the test of second language writing focus on empirical studies, so data collection, control of variables and methods of reducing the impact of subjective factors are all issues that need urgent attention. How to score the second language writing reasonably, how to improve the validity of the scoring criteria, and how to establish a reasonable scoring model are the main problems affecting the research of second language writing. Much more attention of research on second language writing is gradually being paid. Second language writing should not be limited to the study of a single subject, instead, the research on psychology, medicine and other interdisciplinary subjects is more conducive to the in-depth and development of the research on second language writing.

## **6. Conclusion**

Foreign studies on second language writing have great implications for the teaching and research of second language writing in China. The social, educational and academic significance of second language writing research in foreign language environment should be paid close attention to by the foreign language teaching and research community in China. In order to have a dialogue with the international community, the teaching and research association of second language writing can be established, columns on second language writing teaching and research can be opened in foreign language journals, and academic seminars on second language writing teaching and research can be held regularly. These measures are expected to lead the teaching and research of second language writing in China to a deeper level.

## **References**

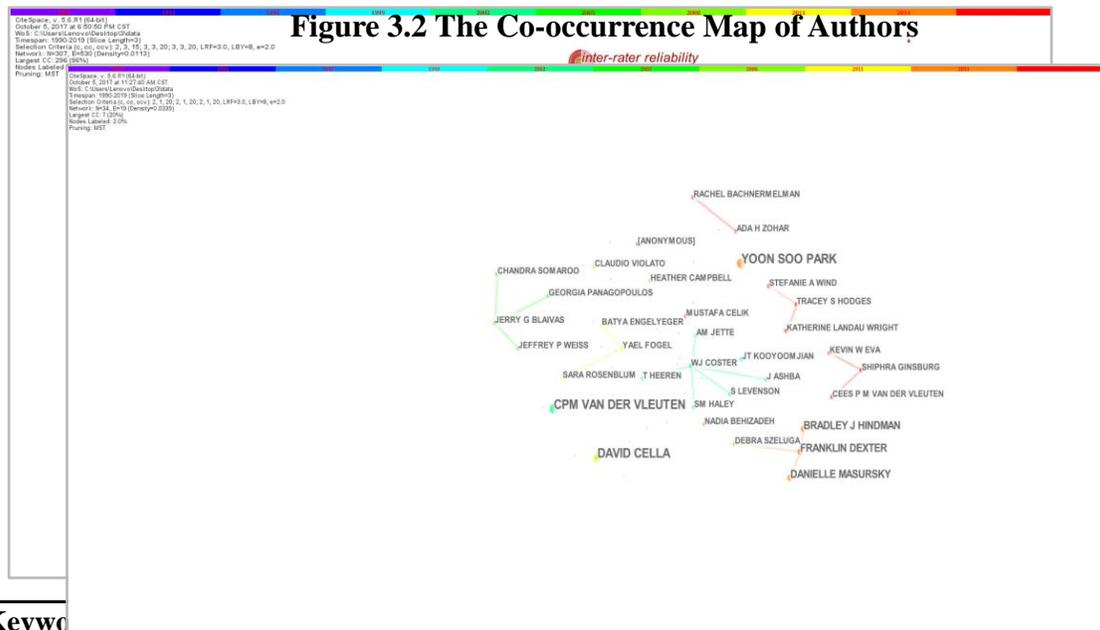
- Duan Chunyu, Cai Jiandong. (2016). International Knowledge Mapping in the Field of Ubiquitous Learning [J]. *Modern Distance Education Research*, (1): 85-95
- Kroll B(Ed.). (2003). *Exploring the Dynamics of Second Language Writing* [C]. NewYork: Cambridge University Press, 71-92.
- Ma Guanghui, Wen Qiufang. (1999). A Study on the Influencing Factors of College Students' English Writing Ability [J]. *Foreign Language Teaching and Research*, (4):34 -39.
- Small, H. (1986). The Synthesis of Specialty Narratives from Co-citation Clusters [J]. *Journal of the American Society for Information Science*, 37: 97.
- Wang Wenyu, Wan Lifei. (2004). Research on Second Language Writing: A Ten-year Review and Prospect [J]. *Foreign Language World*, (3):51-58.
- Yang Jingqing. (1996). A Feedback Mechanism to Improve the Effectiveness of English writing Evaluation——Experiment and Analysis [J]. *Foreign Language World*, (3):41-45.
- Yan Shouxuan, Zhu Ningbo, Zeng Youlai. (2014). The Hot Topics and Their Evolution of Curriculum Research in China in the Past 12 Years -- A Visual Analysis based on the Co-occurrence Knowledge Map of Keywords in CSSCI Database from 2001 to 2012 [J]. *Global Education*, (3):64-72.
- Zhang Lingzhi. (2012). China's Higher Education Research hot spots and Knowledge Visualization Map Analysis Since 1998——based on CSSCI Higher Education Papers Analysis of Key Words [J]. *Higher Education Exploration*, (2):41-46.

Zhang Zishi. (2015). Analysis of Network Learning Knowledge Map based on CiteSpace [J]. China Educational Technology, (8):77-84.

**Table and Figures**

**Table 3.1 The Co-occurrence Map of Keywords**

**Figure 3.1 The Co-occurrence Map of Keywords**



List of Keyword				
No.	Freq.	Centrality	Time	Key words
1	110	0.16	1999	Performance
2	94	0.12	2000	Internal Consistency
3	84	0.12	1999	Validation
4	82	0.1	1997	Student
5	79	0.03	2002	Psychometric Property
6	71	0.1	2005	Quality of Life
7	71	0.09	2001	Cronbachs Alpha
8	70	0.12	2002	Assessment
9	65	0.04	2005	Questionnaire
10	63	0.16	1999	Content Validity
11	63	0.09	2000	Significant Difference
12	61	0.04	2003	Education
13	55	0.2	1999	Test-retest Reliability
14	54	0.07	1996	Children
15	54	0.22	2001	Skill
16	47	0.04	2002	Scale
17	45	0.1	1994	Factor Analysis
18	44	0.02	2008	Confirmatory Factor Analysis
19	43	0.14	1999	Competence
20	41	0.09	1994	Exploratory Factor Analysis

Figure 3.3 (1) The Co-occurrence Map of Institutions

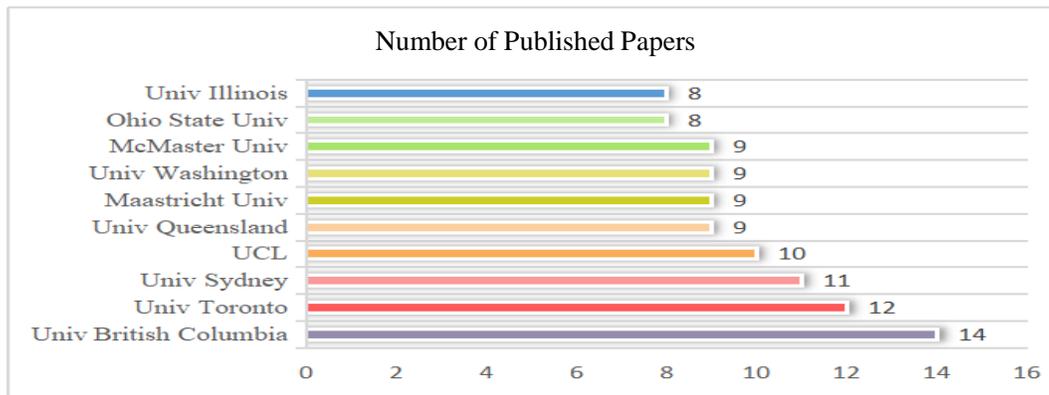
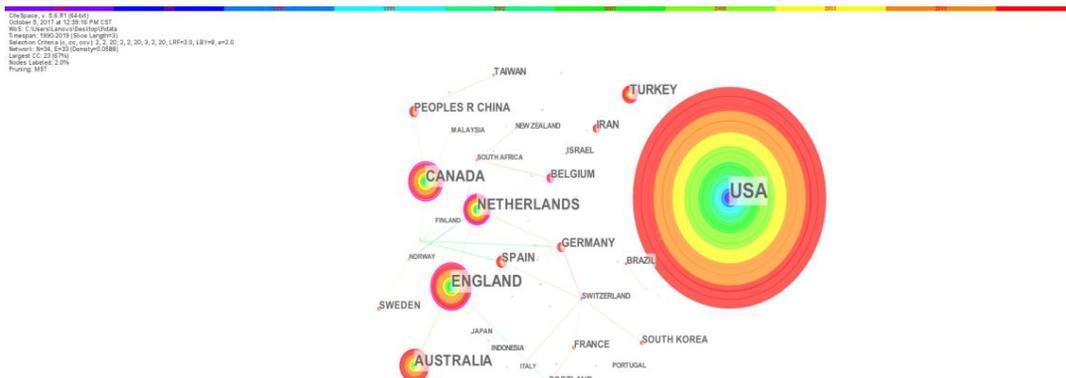


Figure 3.3 (2) The Co-occurrence Map of Institutions



Figure 3.4 The Co-occurrence Map of Nations



**Table 4. Strategic Diagram**

No.	Attention	Novelty	Cluster Name
1	3.75	-4.41	L2 writing ability of medical students
2	-7.35	-5.41	loss of ability of L2 writing
4	-9.18	5.59	dysgraphia
5	5.72	-3.71	the restoration of handwriting
6	3.57	-12.41	assessment methods for L2 writing
7	-2.18	-7.91	self-assessment of L2 writing
8	-4.81	-7.29	evaluation of a specific text
9	76.12	-7.81	reliability and validity of the L2 writing test
12	-8.85	3.75	influencing factors of L2 writing performance
13	-2.18	-8.41	assessment criteria for L2 writing
14	21.32	-7.61	assessment of L2 writing ability
15	-3.25	3.30	internal factors influencing L2 writing
16	7.32	-1.08	L2 writing teaching
17	-9.02	0.92	degree of completion of L2 writing
19	-7.88	7.99	the relationship between mother tongue and L2 writing
20	11.19	-1.16	empirical study on the influencing factors of L2 writing
21	-1.68	4.14	instructions in L2 writing
22	-7.88	8.99	L2 writing test
24	-3.02	4.59	content validity of the L2 writing test
25	-1.18	3.25	Feedback on L2 writing
26	15.65	-8.08	factors influencing the score of L2 writing
27	-11.68	-6.41	testing and pre-testing
28	8.75	-0.70	L2 writing model
29	31.57	-10.16	the relationship between students' emotion and L2 writing
30	0.12	-7.01	cognition of L2 writing
32	-2.35	-6.41	relevance in L2 writing
33	-3.18	5.71	motivation for L2 writing
34	-7.48	4.59	empirical research methods for L2 writing
35	-9.02	8.92	medical L2 writing education
36	-8.18	4.09	intrinsic validity and reliability
38	10.32	3.92	L2 writing education
39	-2.35	-1.75	phase testing and review
40	-7.68	8.92	the relationship between gender and L2 writing performance
41	-5.68	2.59	L2 thesis writing
43	-6.93	6.84	new tool for the study of L2 writing
46	-9.68	-3.41	factors influencing reliability and validity
48	-10.02	8.25	the influence of attitude on L2 writing

Figure 4. Strategic Diagram

