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Visual Analysis of Research on Chinese Phonetics Teaching Based on China National Knowledge Infrastructure

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Abstract: In this paper, CiteSpace analysis was used to summarize the Chinese phonetics teaching in the past 42 years for visual analysis. Firstly, we manually searched the China National Knowledge Infrastructure (CNKI) database from 1982-2024, and got 961 valid documents after de-emphasis, which were imported into CiteSpace software for the visual knowledge mapping analysis. In terms of keyword clustering, we obtained 10 keyword clusters in 4 major categories, such as phonological ontology knowledge, bias analysis, pedagogical suggestions, and country-specific analysis. In terms of keyword emergence, we found that the academic community has focused on the study of Chinese phonological ontology from 1994 to 2013, and that the term "pedagogical strategies" first appeared in 1999, followed by a slow transition in 2011, and then a slow transition in 2011, and a slow transition in 2011. Research on "teaching and learning" has always been in the hot spot. The number of articles published in 2012 and 2014 had two high points, 39 and 41, respectively. Finally, the author suggests that the research on Chinese phonetics will continue to grow, and with the rapid development of information technology, Chinese phonetics will integrate more new media and educational technology tools to improve teaching efficiency and quality.

Keywords: Chinese Phonetics, Teaching Strategies, Visual Analysis

1. Introduction

As a teacher of Chinese as a Second Language (CSL), the author has contacted hundreds of non-native Chinese learners and found that both beginners who have just learnt Chinese and intermediate/advanced learners who have learnt Chinese for several years have obvious phenomena of "foreign accents and foreign tones" and substandard pronunciation. As the material shell of language, phonetics is the first prerequisite for social communication. Shi Feng explored "Audible language is the basic form of human language, because human language is audible; that is, all the contents of the language (structure, semantics, function, pragmatics, emotion) are expressed through phonetics, and at the same time through phonetics to receive and understand. So whether you study a language or learn a language, you must first study and learn the phonetics of the language"[1], which shows the importance of phonetics. In the process of teaching Chinese as a second language, facing the prominent problems revealed nowadays; it especially poses a significant challenge to the teaching of short-term training aimed at improving learners' Chinese listening and speaking skills. Why is this the case?

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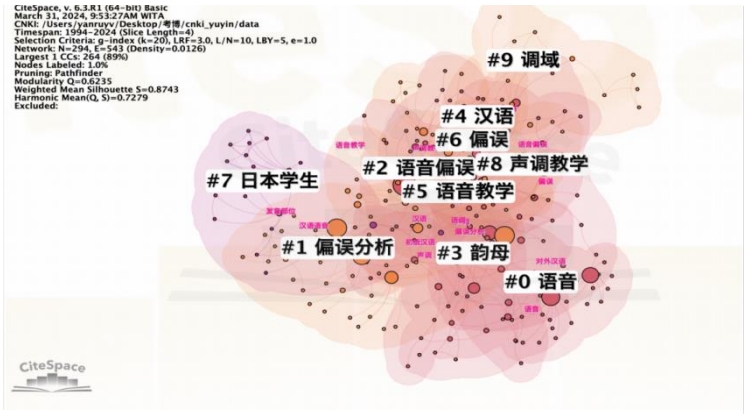
In order to clarify the research status and analyse the problems, the author searched the literature from 1982 to 2024, with the keyword "Chinese language phonetics" in China National Knowledge Infrastructure (CNKI), and analysed the literature for a total of 42 years, manually screened out 1200 pieces of related literature, and obtained 961 pieces of valid literature after de-emphasis. In this paper, we will use the literature analysis software CiteSpace to assist the author's analysis of the literature, and import the valid documents obtained from the China National Knowledge Infrastructure into CiteSpace for a comprehensive visual econometric analysis. CiteSpace is a scientific literature analysis tool jointly developed by Dr. Chaomei Chen of the School of Information Science and Technology at the University of Redevelopment, USA, and the WISE Laboratory at the University of Science and Technology, Dalian, China. It is mainly software to measure the literature in a specific field in order to present the structure and trend of research in a certain subject area. In the face of a huge amount of literature, CiteSpace is able to quickly pinpoint keywords and research hotspots of Chinese language teaching and learning, helping the author to clarify the past and present development history of the field of Chinese language teaching and learning, and to draw the current active research frontiers and future development trends.

2. Visual Knowledge Mapping Analysis

2.1. Clustering analysis of research keywords

The keyword co-occurrence knowledge graph of Chinese phonetics teaching can reflect the research hotspots in the academic community. The keyword clustering map of Chinese phonetics teaching (see Figure 1) has 294 nodes (keywords), 543 connecting lines, with a density of 0.0126, and can be divided into 10 clusters from #0 — #9. There are also similar internal feature words within different clusters, so the author divides the 10 clusters and internal feature words into 4 major categories, and under each cluster we will briefly describe the representative literature.



#0 Phonetics
#1 bias analysis
#2 phonetic bias
#3 Rhymes
#4 Chinese
#5 Phonics teaching
#6 bias
#7 Japanese students
#8 Tone-setting teaching
#9 Tonal Domain

Figure 1: Keyword clustering mapping for teaching Chinese phonetics.

(1) Phonological Ontology Knowledge — 4 clusters

There are 4 clusters of phonological ontological knowledge, including the categories of #0 Phonetics, #3 Rhymes, #4 Chinese, and #9 Tonal Domain. Yi Hongchuan explored the characteristics of character sounds and strategies for their teaching[2]. Dong Yuguo explored how to train tones[3]. Cui Fengling investigated the problem of light and heavy tones in teaching Chinese as a foreign language phonetics[4]. Wang Anhong explored the teaching of Chinese tone features[5]. Ye Jun reanalysed the syllable structure of Mandarin from the perspective of metrical studies[6]. Yu Jiang

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worked out a new lesson plan for teaching tones[7]. Zhang Hongjian provided an overview of the research on the acquisition of tones in Chinese as a foreign language[8].

(2) Bias analysis — 3 clusters

There are 3 clusters of bias analysis, including #1 bias analysis, #2 phonetic bias, #6 bias and other categories. In the 1980s, after Lu Jianji cited Corder's and Slinkier's "theory of bias analysis"[9], the theoretical basis for the study of the phonology of Chinese as a second language shifted from "theory of contrastive analysis" to "theory of contrastive analysis". "Since then, the theoretical basis of Chinese as a second language phonological research has shifted from the theory of contrastive analysis to the theory of bias analysis and the theory of mediated language. The application of the theory of bias analysis to second language phonological teaching and research has been widely recognised. Liu Mingzhang's Phonological Errors and Phonological Comparison: The Problems of Teaching Chinese Phonetics to Korean Speakers[10]. Zhou Yi explored the mechanisms of foreign students' pronunciation errors in Hanyu Pinyin and their teaching countermeasures[11]. Luo Yin analysed Russians' Phonological Errors in Learning Chinese[12]. Ye Nan conducted research on the phonological bias of Chinese as a foreign language[13]. Ren Qianfang and Li Jinjin analysed the problem of reforming the phonetics teaching of advanced level international students, starting from the phonetics bias of international students[14]. Zhang Linhua used Parrt software to study and analyse the problem of Korean students' Chinese phonetics errors[15].

(3) Teaching suggestions — 2 clusters

There are two clusters of teaching suggestions, including #5 Phonics teaching and #8 Tone-setting teaching. Cheng-Tang discussed several problems in teaching Chinese phonetics to foreigners,and made suggestions for improving the effectiveness of phonics teaching[16]. Gu Zheng and Wu Zhongwei investigated how to teach phonetics to international students at the introductory stage[17]. Chen Wenbo explored the teaching of Chinese phonetics to international students from Central Asia[18]. Lu Jianji puts forward a reconsideration of several basic issues in teaching Chinese as a foreign language[19]. Wang Qingxiao discussed the teaching and learning of modern Chinese phonetics[20]. Li Danqing discusses the "foreign accent" and the teaching of Chinese as a foreign language, and makes suggestions[21]. Cui Fengling studied the problem of light and heavy tones in teaching Chinese as a foreign language[22]. Hu Xiuchun discussed the classroom teaching link of hearing and speaking Chinese as a foreign language[23]. Feng Yuliang tried to talk about the difficulties in teaching primary Chinese listening phonetics and put forward teaching countermeasures[24]. Lin Jianping put forward the positioning and focus of international Chinese phonetics teaching[25]. Hu Shuangbao put forward two arguments about Chinese phonetics teaching[26]. Wang Wei puts forward the theoretical and practical research problems of teaching Chinese phonetics to foreigners in his review of Teaching Chinese Phonetics to Foreigners[27]. Xu Kunyu,Shi Feng argued for a shortcut to Chinese phonetics teaching - the concise phonetic system of Mandarin paraphrasing[28].

(4) Nationalisation Analysis — 1 cluster

There was a total of one cluster for the countryisation analysis, including #7 Japanese students. In conjunction with the overall literature analysis, students from other countries besides Japanese students are also prominent. He Ping talked about how to teach elementary Chinese phonetics to Japanese students[29]. Zhang Lijun suggested the need for targeted phonics instruction for Japanese students[30]. Mei Li studied the phenomenon of phonological variation in Japanese students' acquisition of Mandarin rolled tongue consonants, using Tarone's and others' theory of phonological variation as an orientation[31] Huang Jingjun looked at Vietnamese students' Chinese phonological learning from Robert Gardner and Wallace Lambert's theory of motivation in an attempt to gain insight into the relationship between motivation and foreign language learning[32].

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2.2. Analysis of Research Hot Spots

As shown in figure 2 below, the Keyword emergence can reveal to us the year of keyword emergence and hot trends. Keyword emergence mapping allows the discovery of specialised vocabulary that has increased dramatically in a short period of time in a given year, and observes deeper developmental changes from the trend of changes in the duration length of the keyword's hotness. As can be seen in Figure 2, during the 20-year period from 1994 to 2013, keywords such as "parts of phonetics, non-aspirated sounds, phonological teaching, phonemes, phonological awareness, modern Chinese" are very hot and tend to be mostly used in the study of phonological ontology, and the keyword "part of phonetics" first appeared in 1994, with an intensity of 4.07, and the research hotspot broke out in 1994 and ended in 2013. The research hotspot in these 20 years mainly focuses on the knowledge of phonological ontology. The keyword "contrast", which plays a role in the past, appeared for the first time in 2003 and ended in 2007, after which the keyword gradually transitioned to focus on research in teaching and learning. In the last two decades, the keywords "teaching strategies, instructional design, causes of bias, pedagogical suggestions, Chinese language acquisition, comparative analysis, tonal bias, and countermeasures" exploded one after another. The term "instructional strategies" first appeared in 1999, and teaching remained a hot topic until "instructional design" in 2024.

Keywords
parts of phonetics
non-aspirated sounds
phonological teaching
phonemes
phonological awareness
modern Chinese
contrast
teaching strategies
instructional design
causes of bias
pedagogical suggestions
Chinese language acquisition
comparative analysis
tonal bias
countermeasures

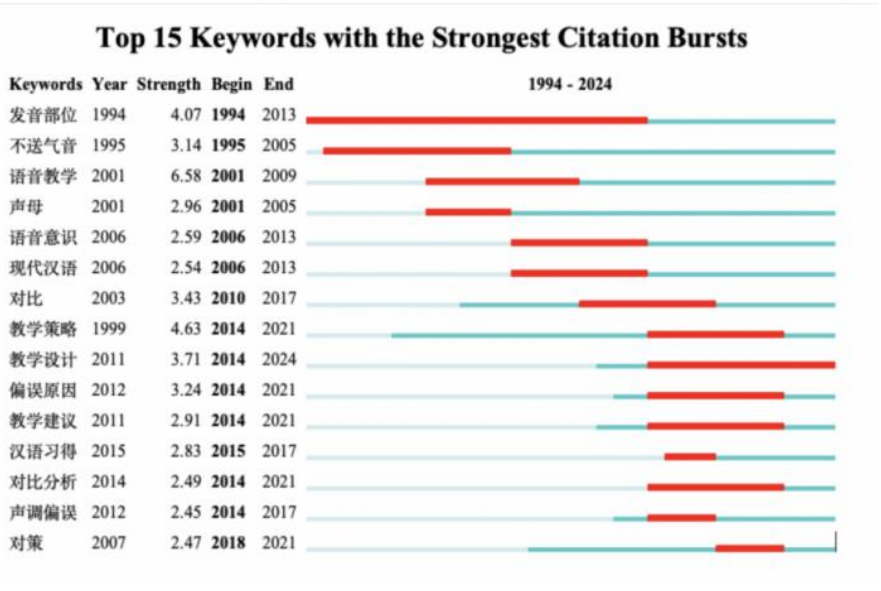

Figure 2: Keyword emergence mapping for teaching Chinese phonetics

The citation year ring represents the citation history of a particular article, with the overall size of the year ring reflecting the number of times the paper has been cited. As can be seen from Figure 3, "Chinese phonology, rhyme, phonological bias, phonological teaching" are the more prominent citation topics, representing a relatively large number of citations between 2000-2005, which is the hot topic of that year. Between 2005-2015, "acquisition bias, rhyme, acquisition regularity influencing factors, teaching difficulties, auditory discrimination experiments, country-specific Chinese teaching, tonal value, tongue twisters, intermediate tones, duration, audio, and pitch" are the more popular citation themes. In the period of 2015-2024, "paediatrics, double character tones, triadic vowels, secondary vowels, case studies, types of deviation, retroflexes, nationalisation" are also popular citation themes in this decade.

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Figure 3: Timeline mapping of keywords for teaching Chinese phonetics.

2.3. Analysis of the Trends and Influencing Factors

According to Figure 4, it can be seen that at least one article has been published every year from 1982 to 2024. The number of articles published had two high points in 2012 and 2014, which were 39 and 41 articles, respectively. It then trended downwards. there was a brief rebound in 2018 at 24 articles, followed by consecutive years of decline. in 2023, it was only 7 articles.

The important factors affecting the number of articles are diverse, and as far as the author is concerned, they can be detailed in the following aspects:

(1) Technological development: technological advances have dramatically changed the face of education and academic research. For example, the rise of online courses, open online courses (MOOCs), and virtual classrooms has made it easier for academics to share knowledge and research results, as the focus of teaching and learning may shift to how to utilise the new technologies for teaching and learning.

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(2) Socio-economic factors: Changes in the economic environment may affect financial support for education and research. Economic growth may lead to more investment flowing into education, which in turn increases the volume of academic publications. Conversely, an economic crisis or recession may lead to cuts in education budgets and reduced funding for research, affecting scholarly activity and publications.

(3) Public health events: the COVID-19 pandemic is a notable example of an event that had a dramatic impact on the global education system. School closures and social distancing measures led to the suspension or transfer of traditional face-to-face teaching methods to online, which may have led to increased or decreased urgency in research on Chinese language phonetics.

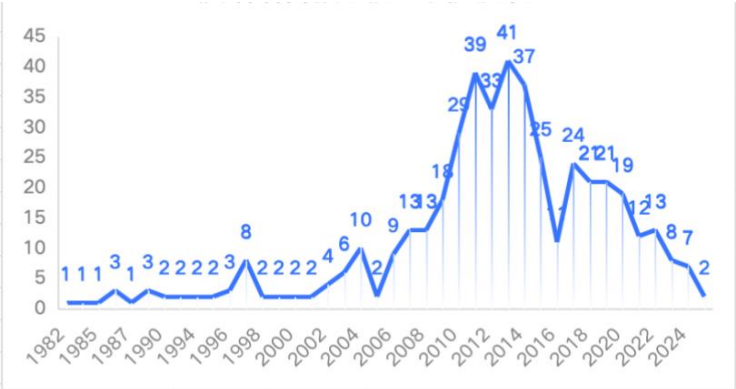

Figure 4: Graphical representation of the trend in the number of articles published over the years on phonics teaching.

3. Conclusion

The author used CiteSpace analysis to summarize the situation of Chinese phonetics teaching in the past 42 years for visual analysis, including keyword clustering analysis, keyword emergence analysis, timeline analysis, and analysis of the amount of articles published in the past years and the factors affecting them. With the rapid growth of China's economy and the expansion of its international influence, and the implementation of the national "Belt and Road" programme, more and more people around the world have begun to learn the Chinese language in the hope of obtaining more educational and vocational opportunities through mastering this language, so the author believes that the research on the teaching of Chinese phonetics is meaningful. The rapid development of information technology has also allowed Chinese phonetics teaching to integrate more and more new media and educational technology tools, the accumulation of a large amount of phonetics corpus and teaching data has also enabled researchers to use big data analysis to reveal the patterns and trends of Chinese phonetics teaching so as to help to the development of second language Chinese teaching.

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