A Bibliometric Analysis on Teaching Chinese as a Second or Foreign Language Outside Mainland China (2001-2020) *

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Abstract—This paper analysed a total of 334 English language articles on teaching Chinese as a second or foreign language from the Web of Science, during the period from 2001 to 2020. By examining the bibliometric indices of the literature, the analysis found that: 1) The numbers of research publication and citation have gone through slow growth in the first decade and strong growth in the second decade. 2) Highly cited journals are mainly from four categories: educational technology, linguistics, education and psychology. 3) Highly productive authors are mainly from the fields of computing and education, with research interests focused on the use of digital technology to help Chinese language learning. 4) Highly co-cited articles include keywords related to young Chinese learners, foreign language, English context and character learning. 5) The topical trends in Chinese language education research have evolved from an early focus on Chinese writing, learning strategies and cross-cultural language teaching to a mid-term focus on issues such as classroom management and task-based teaching, and further expansion to a more recent focus on the integration of digital technologies and multimodal approaches to teaching and learning. By reviewing these five areas, this study aims to provide a complete picture of the research on teaching Chinese as a second or foreign language outside mainland China. It is intended to help build bridges of collaboration between researchers and institutions within and outside mainland China by highlighting the researchers who have made significant contributions and the wide range of issues being explored.

Index Terms—teaching Chinese as a second or foreign language, international journals, bibliometric analysis

I. INTRODUCTION

As Chinese plays an emerging international language role in the linguistic diversity in the world (Gong et al., 2020; Ma et al., 2017; Moloney & Xu, 2015; Qi & Lai, 2017; Wang, 2010), an increasing number of scholars have taken note of the development of Chinese language education overseas (Gong et al., 2018; Xu et al., 2014). Existing reviews provide useful insights into teaching Chinese as a second or foreign language (CFL/CSL), but most of these reviews focus on the research publications in the Chinese-speaking world within mainland China (Gong et al., 2018; Ma et al., 2017). For example, Gong et al. (2020) systematically reviewed 60 pieces of empirical research literature on CFL/CSL published in relevant academic journals in mainland China between 2014 and 2018. Ma et al. (2017) conducted a review of the themes, methods and findings of relevant studies published in four major journals in mainland China between 2005 and 2015 and found that researchers in mainland China had explored a wide range of issues such as language policy and planning, language pedagogy, and teacher development, but a large number of non-empirical articles continued to be published in these journals. Furthermore, most researchers worked primarily to meet local needs and interests, i.e. with a local learner orientation, which has led to research findings that significantly impact CFL/CSL teaching and learning within mainland China (Gong et al., 2020), while the impact on international language education research and pedagogical development remains limited and marginal (Ma et al., 2017). Gong et al. (2018) compared 1358 Chinese language articles from CNKI and 175 English language articles from WoS from 2004-2016 in order to analyse the frequency of keyword co-occurrence and thematic trends of related research. However, this study used a coarse granularity of search terms and did not use wildcards, in addition to examining fewer measures to provide a detailed index of network structure.

Research on CFL/CSL teaching and learning within and outside mainland China seems to be in two worlds (Gong et al., 2018), and a complete picture of the overall status in international journals seems to be lacking. In order to build bridges of knowledge sharing and mutual exchange, a review of relevant research on CFL/CSL published in

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international journals is undoubtedly crucial and urgent. With this in mind, in this review we focused on the aspects of authors, journals, articles and keywords in the field of CSL/CFL teaching and learning and conducted a bibliometric analysis of 334 articles published in Web of Science's Social Science Citation Index (SSCI) and Arts and Humanities Citation Index (A&HCI) databases from 2001 to 2020, to answer the following five research questions:

1. What are the trends in the number of publications and citations of relevant articles?
2. Which are the most co-cited international journals?
3. What research issues have been focused on by the most published authors?
4. What are the characteristics of the clustering of keywords discussed in the related articles?
5. What are the changing trends in related research topics?

II. METHODOLOGY

A. Database Selection

The Web of Science (WoS) database is a relatively comprehensive collection of most of the literature in the social sciences, arts and humanities, and its core collection includes a wide range of high-quality peer-reviewed academic journals, which is useful for researchers to understand advances and trends in their disciplines (Börner et al., 2003). Therefore, we focused on the English-language journal articles from the Social Science Citation Index (SSCI) and Arts and Humanities Index (A&HCI).

B. Article Selection

This review tends to observe relative research developments from 2001 to 2020, and the search employed a wildcards strategy, a method that covers as wide a range of topics and journals as possible (Chen et al., 2012), to ensure that the data are comprehensive. After several rounds of testing, we identified search terms with “Chinese as $ second/foreign language; Chinese language teach*/learn*/class*”, where the dollar sign ($) denotes zero or one character; the asterisk (*) denotes any group of characters, including null characters, to contain most CSL/CFL related publications.

C. Inclusion Criteria

Articles searched from the WoS were limited to the research categories “Linguistic”, “Language Linguistic” and “Education Educational Research”, the main type of document was “Article” and the search language was “English”. The data was retrieved on 5 January 2021 and the research needed to be relevant to CSL/CFL. Two authors read the title and abstract of each retrieved data item to ensure that the content of the article was consistent with the purpose of the research, and in the rare case where an item was disputed, the full text was read and assessed. The resulting 334 valid data articles were generated and were checked and collated prior to analysis.

D. Research Tools

This review used Citespace (version 5.7.R2) as the data processing software, to visualise and present the bibliometric index, including authors, journals, articles and noun terms, by generating a scientific knowledge map, and to reveal the current status and cognitive structure of the research field in these areas (Chen et al., 2012).

III. RESULTS

A. The Overall Numbers of Publication and Citation

The overall number of articles published provides an indication of the disciplinary activity and maturity of the research area, while the frequency of citations reflects the level of academic interest in the field (Chen, 2016). As shown in Figure 1, the total number of articles published in relation to CSL/CFL teaching and learning has trended upwards over a 20-year period from 0 articles in 2001 to around 50 articles in 2020, indicating that the field is beginning to gain attention and is growing as a vibrant research area (Chen et al., 2012). On the other hand, the number of citations shows a similar trend to the number of publications, with the number of citations increasing slowly until 2010 and at a high rate every year since then. Excluding self-citations, the total number of citations over the 20-year period is over 2,500, with an average of about 7.5 citations per article.
B. Co-Citation Analysis of Journals

The co-citation analysis of journals can help researchers understand the distribution of information in a field of knowledge to quickly focus on important journals (Chen, 2016). Table 1 summarises the top 10 co-cited journals in the field of Chinese language teaching research, which can be broadly classified into four categories. Firstly, journals in the discipline of linguistics represented by Applied Linguistics, mainly focus on the dissemination of theoretical knowledge and applied innovation. Secondly, there are educational technology journals represented by Language Learning and Technology, which publish articles mostly related to the use of emerging information technologies to improve language teaching and learning, often of a cross-disciplinary nature. Thirdly, as represented by System, some international journals are concern with the teaching of foreign languages and publish articles that mostly combine applied linguistics and educational technology. Fourthly, the Journal of Educational Psychology is a psychology-oriented journal, with most of its articles dealing with neuropsychology and cognitive psychology, and relevant theories have begun to be cited in CSL/CFL related research, such as the relationship between orthographic awareness and reading and writing. Compared to other highly cited journals, the Journal of Chinese Language Teachers Association (JCLTA) is to some extent a journal that concentrates on the teaching and learning of CSL/CFL and is a scholarly journal that specialises in publishing articles related to Chinese language education. The co-citation mapping of journals in Figure 2 shows that journals in the fields of applied linguistics and education provide the main platforms for CSL/CFL researchers to facilitate the mutual exchange of knowledge and experiences, which is cross-cited and relatively closely linked.

### Table 1

<table>
<thead>
<tr>
<th>Rank</th>
<th>Name of Cited Journal</th>
<th>Journal Disciplines</th>
<th>Cites</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>System</td>
<td>“Linguistics”, “Education and Educational Research”</td>
<td>120</td>
</tr>
<tr>
<td>3</td>
<td>Foreign Language Annals</td>
<td>“Linguistics”</td>
<td>98</td>
</tr>
<tr>
<td>5</td>
<td>TESOL Quarterly</td>
<td>“Linguistics”, “Education and Educational Research”</td>
<td>91</td>
</tr>
<tr>
<td>6</td>
<td>Applied Linguistics</td>
<td>“Linguistics”</td>
<td>85</td>
</tr>
<tr>
<td>7</td>
<td>Language Learning and Technology</td>
<td>“Linguistics”, “Education”</td>
<td>67</td>
</tr>
<tr>
<td>9</td>
<td>Journal of Educational Psychology</td>
<td>“Psychology”</td>
<td>64</td>
</tr>
<tr>
<td>10</td>
<td>Reading and Writing</td>
<td>“Linguistics”, “Education and Educational Research”</td>
<td>52</td>
</tr>
</tbody>
</table>
C. Leading Researchers and Publications

The number of articles published by leading researchers is somewhat representative of how active they are in the field (Chen, 2016). Table 2 lists the six researchers in the top four (including those tied for the top spot) in terms of the number of published articles. According to the timing of their first publications, most of the authors had already focused on the field of CSL/CFL and conducted research on related issues around 2010.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Author</th>
<th>Number of Articles Published</th>
<th>Year of First Publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chun Lai</td>
<td>10</td>
<td>2011</td>
</tr>
<tr>
<td>1</td>
<td>Yuju Lan</td>
<td>10</td>
<td>2010</td>
</tr>
<tr>
<td>2</td>
<td>Lung-Hsiang Wong</td>
<td>9</td>
<td>2011</td>
</tr>
<tr>
<td>3</td>
<td>Ching Sing Chai</td>
<td>7</td>
<td>2011</td>
</tr>
<tr>
<td>4</td>
<td>Yu-Ka Wong</td>
<td>6</td>
<td>2017</td>
</tr>
<tr>
<td>4</td>
<td>Kuoen Chang</td>
<td>6</td>
<td>2010</td>
</tr>
</tbody>
</table>

In terms of the total number, the six authors with the highest number of publications from 2001 to 2020 and their research areas are as follows. Chun Lai (10 articles) focuses on the intercultural awareness and teacher development of Chinese language teachers, the Chinese language learning of South Asian minorities in Hong Kong, as well as on the Chinese language teaching methods, such as the teaching of Chinese characters and the use of task-based teaching in Chinese classrooms. Yuju Lan (10 articles) focuses on how to effectively use mobile learning devices, such as the Second Life (SL), to improve Chinese language proficiency in terms of writing, oral communication, and listening comprehension. Lung-Hsiang Wong (9 articles) focuses primarily on computer-supported collaborative learning and seamless Chinese language learning, exploring the impact of digital devices on the development of orthographic awareness among young students. Ching Sing Chai (7 articles) focuses on the relationship between the development of technological knowledge and teacher beliefs among Chinese language teachers in Singapore, and the relationship between students' Chinese computing input skills and their performance in composition. Yu-Ka Wong (6 articles) focuses on the effects of good orthographic knowledge and fluent Chinese character recognition skills on Chinese learners' reading performance, and the relationship between Chinese character reading and listening comprehension. Kuoen Chang (6 articles) focuses on mobile assistive devices to improve Chinese language learners' proficiency and the grading of Chinese reading materials.

Apart from using a time slice of 20 years and a g-index algorithm for data thresholding (k=20), a pathfinding algorithm was adopted to generate a map of leading researchers and institutions over the period 2001-2020. As shown in Figure 3, Ching Sing Chai and Lung-Hsiang Wong have collaborated extensively in the field of seamless teaching.
and learning, focusing on the development of teachers' digital competencies and mobile device-assisted Chinese language learning. On the other hand, Kuoen Chang and Yuju Lan have had a closer collaboration, with three of the former's six articles being co-authored by the two researchers.

Figure 3: A Hybrid Network of the Leading Researchers and Institutions (2001-2020)

D. Co-Citation Analysis of Articles

Citing other articles can be seen as the flow of knowledge from a different research topic to the current research topic being conducted, meaning that knowledge moves from a state of wandering to reorganisation resulting in new knowledge. As scientific research continues to advance, papers on related topics then form citation networks (Chen, 2016). Co-citation analysis of articles refers to the fact that when two articles co-occur in the references of a third article, the two articles form a co-citation relationship and the clusters are formed to reveal the themes that these co-cited articles share (Chen et al., 2012). In this study, a time slice of one year was used for data thresholding with the g-index algorithm (k=20), and the map was generated by a pathfinding algorithm. The log-likelihood ratio (LLR) algorithm was used for literature clustering. The modularity value of clustering Q=0.8678>0.3 indicates a significant clustering network structure. The Silhouette value, a measure of network homogeneity, s=0.9655>0.7, indicates that the clustering has high reliability. Figure 4 shows the cluster analysis mapping of related articles, with the gradient colour band at the top showing temporal information; from left to right, the further to the right the colour block is, the closer the average publication date of the articles in that cluster is to the present time, such that orange and red clusters represent studies published in most recent years.
Based on the clustering parameters, the largest cluster is #0, labelled as Young Chinese Learner, whose average article publication year is 2016. In a qualitative study of this cluster, Loh and Tam (2016) found that the social mobility of ethnic minority students was highly correlated with their Chinese language proficiency, suggesting that in light of recent demographic changes and classroom realities to make policy adjustments to help ethnic minority students improve their Chinese language proficiency and integrate into Hong Kong society to address intergenerational poverty. In a quantitative study of this cluster, Xu et al. (2014) explored the role of radical-based grouping pedagogy in Chinese character learning and examined the effect of radical-based grouping on the morphological, phonological and meaning representations of Chinese characters and the development of radical knowledge, and found that it is beneficial to introduce learners to recurring radicals in compound characters during the Chinese character learning process. In addition to this, Tong and Yip (2015) investigated whether CSL/CFL learners were sensitive to the orthography, phonological and semantic information of radicals, and whether this radical sensitivity was predictive of their Chinese word reading ability, and showed that CSL/CFL learners encoded new words using orthography, phonology and radical semantics in a way that was largely similar to that of native Chinese readers.

The second cluster is #1, labelled as Foreign Language, and focuses on issues such as language learning strategies, whose average publication of the literature is in 2012. Zhang and Li (2010) reviewed the changes in Chinese language learning and teaching in the UK between 2000 and 2010, and introduced the situation, background and characteristics of the communicative approach in the UK. Chen et al. (2013) conducted a quasi-experiment to examine the effect of a radical-derived Chinese character teaching strategy on improving the learning of Chinese as a foreign language, using a web-based teaching platform based on statistical data from the Chinese orthography database explorer as a supplementary teaching tool. Sung and Wu (2011) examined the effectiveness of a radical-derived Chinese character teaching strategy in improving foreign learners' awareness of Chinese orthography, and whether 108 American first-grade learners' Chinese character learning strategies were influenced by learners' gender, family background and previous foreign language experience.

The third cluster is #2, labelled as English Context, which focuses on the beliefs of CSL/CFL teachers, whose average publication of the literature is in 2015. Moloney and Xu (2015) used interviews with nine Chinese language teachers in New South Wales, and concluded that the Chinese teacher cohort's beliefs were in a transitional process of conforming to traditional Chinese educational principles, conforming to constructivist learning principles and flowing in between, in that they saw the need to transform their teaching beliefs in a foreign context, while demonstrating a willingness to learn and change, adjusting their conceptions of teaching to match their teaching practices. The findings and recommendations of this study on Chinese language teachers' belief transformation are useful references for designing more effective teacher training to promote success in Chinese language teaching classrooms. Zhou and Li (2015) collected the experiences and perceptions of six Chinese language teachers regarding classroom management in the U.S. The findings suggest that cultural differences in classroom management play an important role in influencing Chinese teachers' classroom teaching and need to be addressed at the pre-service stage. Wang et al. (2013) examined the differences in educational aims and objectives, learning content, teaching methods and assessment between the
curriculum designs of teacher education in China and Australia, and suggested that the curriculum needed to be adapted to meet the mobility and adaptability required in overseas teaching environments.

In addition to these, two smaller clusters are worth noting. The fourth largest cluster is #8, labelled as Character Learning, and these articles were published on average around 2009 and focus on reading and learning Chinese characters in an English context. Everson (2011) summarised research done before 2011 using non-Roman orthographic writing systems (e.g. Arabic, Chinese, Hebrew and Japanese), with the aim of helping subsequent researchers develop their own research agendas and pedagogical approaches. Guan et al. (2011) verified, through two experiments, that learning to write characters enhances orthographic awareness and thus improves the recognition process of specific words, and that combining handwritten Chinese characters with Pinyin typing can facilitate the learning of Chinese reading. The fifth-ranked cluster is #10, labelled as Native Chinese-Speaking K-12 Language Teachers’ Beliefs and Practices, and the average publication of the literature is in 2011. Haley and Ferro (2011) explored the significant relationship between learner-centred approaches to language teaching and the education teachers had received in their own schools.

E. Topical Trend Analysis

Extracting noun terms from titles, keywords, supplementary keywords and abstracts can reflect to some extent the emerging trend of a research topic in a specific period (Chen, 2016). In this study, a time slice of one year was used as the data threshold with the g-index algorithm (k=10), and the log-likelihood ratio algorithm was used to cluster the extracted noun terms to obtain 16 topics (denoted by # plus the topic name), as shown in Figure 5. According to the average of publication dates of the articles, the 16 topics were divided into seven clusters in chronological order, resulting in the trajectories of topical trends of SSCI and A&HCI indexed articles between 2001 and 2020 shown in Figure 6.
As shown in Figure 6, research in the field of CSL/CFL teaching and learning in international core journals has been enriched and developed during the time period of 2001-2020, and the topical trends show the following characteristics. First, as the topics in Issue 1 and Issue 2 show, the early research focused on Chinese writing (Guan et al., 2011), the development of language learning strategies (Lee-Thompson, 2008; Winke & Abbalh, 2007), and then the research focus has gradually expanded to include cross-cultural language teaching (Hall Haley & Ferro, 2011; Yang, 2008). Secondly, as Issue 3, Issue 4 and Issue 5 demonstrate in terms of topic labels, the mid-term content extended to classroom management (Shen & Xu, 2015; Zhou & Li, 2015), task-based teaching (Bao & Du, 2015; Ruan et al., 2015) and cognitive theory related to Chinese character and vocabulary learning (Xu & Padilla, 2013). Third, the topic labels in Issue 6 and Issue 7 show that the topics have recently expanded further and new features have emerged, such as closer integration with mobile devices (Lan et al., 2019), the emergence of research on multimodal elements in Chinese reading (Godfroid et al., 2017), and integration with machine translation (Xu, 2020). In addition to this, the professional development of Chinese language teachers (Loh & Tam, 2016; Yue, 2017; Zhang et al., 2020) is also a topic of interest during this period. It can be seen that the research concerns in the early stages focused on improving students’ language skills, learning strategies and intercultural communication skills, reflecting the traditional notion of the teacher as a transmitter of knowledge. The mid-term research focused on the classroom management skills and professional development of language teachers, reflecting the ongoing exploration of the discipline in response to the needs of the real state of Chinese education worldwide. More recent research has focused on the integration of digital technology and language teaching, in line with the evolution of educational tools and instruments.

IV. CONCLUSION AND LIMITATION

The development of teaching Chinese as a second or foreign language is a discipline that requires regular categorisation and sorting. In this paper, we use Citespace, a bibliometric software, to analyse articles published in the Web of Science SSCI and A&HCI collections from 2001 to 2020, in terms of the total numbers of articles published and cited, highly co-cited journals, leading researchers, co-cited articles and topical trends. This study tends to help scholars in mainland China and abroad to strengthen their mutual understanding and cooperation in related fields, break the barrier of “two worlds”, and form an academic community.

There are a number of limitations to this study. First, there might be much more literature related to CSL/CFL in the Web of Science database for the time period 2001 to 2020, while we only examined relevant articles in the two core collections, SSCI and A&HCI, which may make the results incomplete. Secondly, we only reviewed journal-type articles, as the open access nature of journals is valued more than other types of publications (Yang et al., 2020). Therefore other types of research, such as book reviews and book chapters, were excluded from the study, which may also have biased the findings. Thirdly, Citespace could be further mined for more detailed network structure indices such as citation bursts and the sigma metric, which could reflect critical nodes in more detail. Therefore, in future research, in addition to further examining other key points of network structure, it is also important to try to include more types of publications as well as to enhance the diversity of data sources to provide a broader perspective of the study.

REFERENCES


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