Analysis of Educational Research Using CiteSpace Applications in CSSCI Journals (2012-2016)

Zixi WANG*, **Yang LIU, Mengya GAO, Jia XI & Chunping ZHENG**

School of Humanities, Beijing University of Posts and Telecommunications, China

*wangzixi0122@163.com

Abstract: This paper adopts content analysis to assess the current state and the trends of educational research using CiteSpace applications in China. 89 peer-reviewed articles are retrieved from Chinese Social Science Citation Index (CSSCI) journals that appeared from 2012 to 2016. Our results show that higher education is the main research setting for these educational studies. CiteSpace applications are mainly used to release research hot topics and trends in the field of educational research. Keywords co-occurrence knowledge maps have a dominant position as presentations of knowledge maps of educational research. The authors believe that this review can facilitate fruitful discussions of future educational research using CiteSpace applications.

Keywords: Educational research, CiteSpace, Knowledge mapping

1. Introduction

With increasingly extensive and in-depth applications of information technology in educational research, visualization technology has received considerable attention over the past few years. CiteSpace is a Java-based application (Chen, 2004) that can analyze connections between authors, institutions, countries, keywords, journals, or references in the scientific literature (Cobo et al., 2011). Based on an analysis of Chinese educational research using CiteSpace applications from 2012 to 2016, this paper aims at investigating the trends and hot topics of educational research in China.

1. Research Design

1.1. Research Methods and Questions

This research adopts content analysis to analyze educational research using CiteSpace applications based on 89 peer-reviewed articles retrieved from Chinese Social Science Citation Index (CSSCI) journals from 2012 to 2016. It attempts to address the following research questions:
- What are the trends of educational research using CiteSpace applications in China from 2012 to 2016?
- What are the research settings and research topics of educational research using CiteSpace applications in China from 2012 to 2016?
- What are the main presentations of knowledge maps in educational research using CiteSpace applications in China from 2012 to 2016?

1.2. Data Sources

In this research, we have retrieved 98 publications in CSSCI-indexed journals from China National Knowledge Infrastructure (CNKI) from 2012 to 2016 based on four keywords: CiteSpace, education, teaching and learning. After excluding irrelevant publications, we finally selected 89 peer-reviewed

articles closely related to this research as data sources. Status of educational research using CiteSpace applications in recent five years has been summarized according to data sources.

1.3. Coding System

Content analysis is a research method which enables researchers to include large amounts of textual information and identify its properties. This research strictly follows the steps of content analysis, regarding each independent paper as an analysis unit in the process of coding and analyzing. This research consulted the coding system proposed by Hsu, Hung, and Tsai (2013), and selected five categories of information for further content analysis, namely the numbers of published articles per year, journals, research settings, research topics and presentations of knowledge maps.

2. Research Results and Discussions

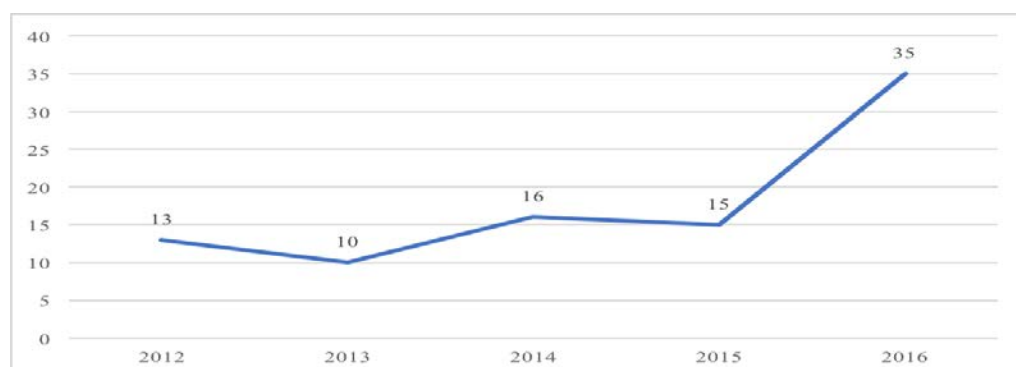### 2.1. Numbers of published articles per year

Figure 1. Numbers of articles published by journals yearly from 2012 to 2016.

As shown in Figure 1, the number of published articles is around 15 from 2012 to 2015, showing a stable and slow development trend. However, the number of articles published rises sharply in 2016 and reaches the top, about 35 articles. This trend reveals applications of visualization technology in educational research have increased sharply in 2016 with increasing attentions to CiteSpace applications of Chinese educational researchers.
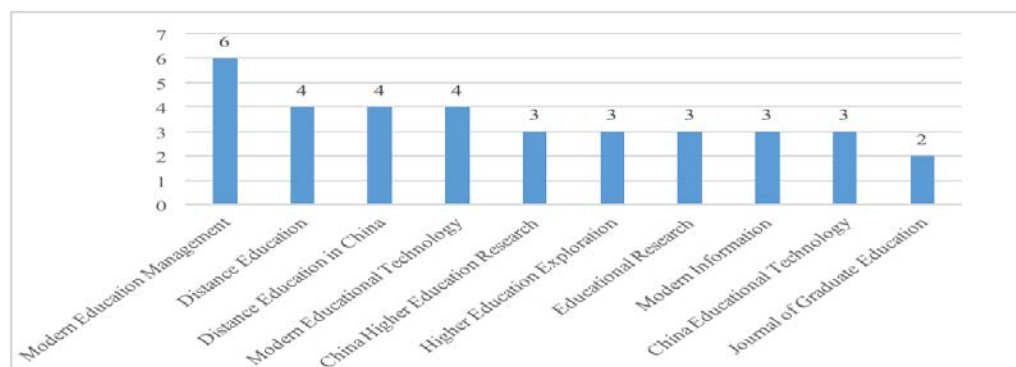
2.2. Journals

Figure 2. The statistics of source journals from 2012 to 2016.

The 89 peer-reviewed articles are published in 58 different academic journals. The distribution of top ten journals is shown in Figure 2. *Modern Education Management* is a representative journal in educational research area, which attaches great importance to the advancement of educational research using CiteSpace applications. Therefore, it published the highest number of articles in the past 5 years.
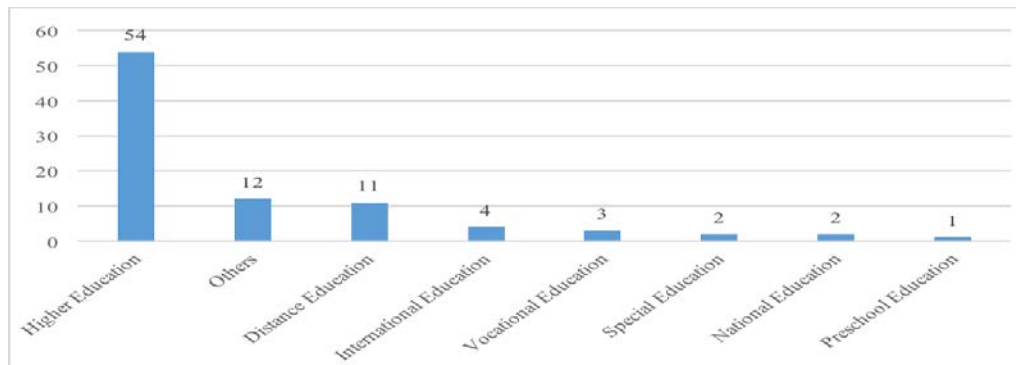
2.3. Research Settings

Figure 3. The statistics of research settings from 2012 to 2016.

As illustrated by Figure 3, 77 articles have specific research settings out of 89 peer-reviewed articles. Our results show that higher education is the main research setting of educational research using CiteSpace applications, implying higher education has always been a focus in the field of educational research. Besides, other research settings include distance education (12.4%), international education (4.5%), vocational education (3.4%), special education (2.2%), national education (2.2%), and preschool education (1.1%).
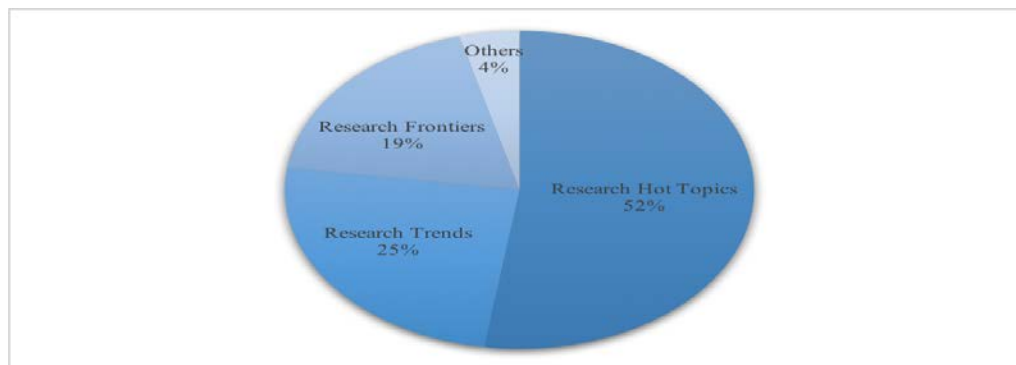
2.4. Research Topics

Figure 4. The statistics of research topics from 2012 to 2016.

Figure 4 tells us clearly that most research analyzed the hot topics of educational research using CiteSpace applications, with 46 articles which accounts for 52% of 89 peer-reviewed articles. Research trends is also a popular topic (22 articles, 25%). Besides, the analysis of research frontiers (17 articles, 19%) and other topics (4 articles, 4%) is also included.
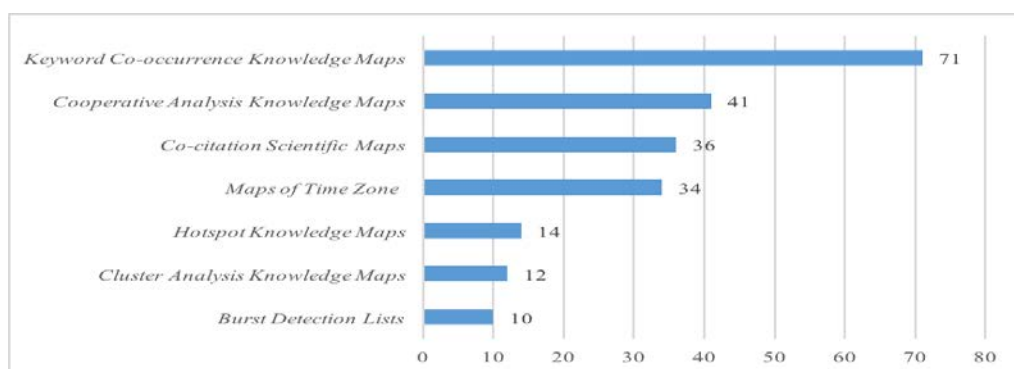
2.5.   *Presentations of Knowledge Maps*

Figure 5. The statistics of presentations of knowledge maps from 2012 to 2016.

Knowledge mapping is defined as processes, methods and tools for analyzing knowledge areas to discover features or meanings and to visualize them in a comprehensive and transparent format (Speel et al., 1999). Our results show that 80 out of 89 peer-reviewed articles used the knowledge maps and in total 218 maps were presented.

As shown in Figure 5, the number of keyword co-occurrence knowledge maps account for the largest percentage (32.6%), revealing that this type of knowledge maps has been most frequently adopted in educational research using CiteSpace applications. Besides, there is a relatively even balance among cooperative analysis knowledge maps (18.8%), co-citation scientific maps (16.5%) and maps of time zone (15.6%). To conduct more comprehensive educational research, researchers need to pay more attention to different presentations of knowledge maps.

3.   Conclusions

In this paper, we make an analysis of educational research using CiteSpace applications based on 89 peer-reviewed articles retrieved from Chinese Social Science Citation Index (CSSCI) journals that appeared from 2012 to 2016. The research results indicate that the growth in the number of articles can be divided into two stages: 2012–2015 (stable stage) and 2015–2016 (rapid growth stage). In terms of source journals, *Modern Education Management* contains the largest number of articles. As for the research settings, a majority of the studies we selected were conducted in higher education setting or concerned the issues related to higher education. A large number of studies investigated the research hot topics and trends of educational research taking advantage of the CiteSpace applications. Keywords co-occurrence knowledge maps serve as the major type of presentations for synthesizing educational research. In order to improve the accuracy and complexity of educational research, a variety of presentations are encouraged. However, it should be noted that there are some limitations in our paper. For instance, the time span of five years is not long enough and the scope of data collection is also limited. We will continue to improve this research in the future.

Acknowledgements

References

Chen, C. (2004). Searching for intellectual turning points: progressive knowledge domain visualization. Proceedings of the National Academy of Sciences, 101(Suppl. 1), 5303–10.

Chen, C., & Paul, R. J. (2001). Visualizing a knowledge domain's intellectual structure. Computer, 34(3), 65–71.

Cobo, M. J., Lopez-Herrera, A. G., Herrera-Viedma, E., & Herrera, F. (2011). Science mapping software tools: Review, analysis, and cooperative study among tools. Journal of the American Society for Information Science and Technology, 62(7), 1382–1402.

Chai, C. S., Koh, J. H. L., & Tsai, C. C. (2013). A review of technological pedagogical content knowledge. Educational Technology & Society, 16(2), 31–51.

Lin, Z., Wu, C. Z., & Hong, W. (2015). Visualization analysis of ecological assets/values research by knowledge mapping. Acta Ecologica Sinica, 35(2015), 142–154.

Li, X. J., Emily, Ma., & Qu, H. L. (2017). Knowledge mapping of hospitality research – a visual analysis using CiteSpace. International Journal of Hospitality Management, 60(2017), 77–93.

Small, H. (2003). Paradigms, citations, and maps of science: a personal history. Journal of the American Society for Information Science and Technology, 54(5), 394–399.

Speel, P. H., Shadbolt, N., Vries, W. D., Dam, P. H. V., & O'Hara, K. (1999). Knowledge mapping for industrial purpose. October 99, Banff, Canada. Conférence KAW99.

Yu, D. J., & Xu, C. (2017). Mapping research on carbon emissions trading: a co-citation analysis. Ecological Engineering, 99(2017), 400–408.