

The Development of Chinese Open Educational Resources Research: A Social Network Analysis Perspective

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Abstract

Open Educational Resources (OER), adhering to the open and sharing concept, is becoming a hot topic all over the world. Since OER was officially defined at the Forum on Open Courseware for Higher Education in Developing Countries in 2002, was soon introduced to China and popularized among scholars. It is important to learn how far China has moved forward in this global OER movement. Social networking analysis (SNA) method was adapted to analysis for the citation of journal papers about Chinese OER. This paper will provide contextual basis for future research as well as practical implications for OER practitioners.

Key words: Open educational resources; social network analysis; citation analysis; current research situation

Introduction

Providing a range of opportunities to share knowledge, improving education fair and expanding higher education participation, (UNESCO, 2002) Open Educational Resources (OER) movement is booming all over the world, especially when an increasing numbers of OER projects in different countries are ongoing, which leading OER movement to be more deeply and broadly.(Zhiwu, 2012) Since 2002, UNESCO launched forum on Open Courseware for Higher Education in Developing Countries, OER was soon introduced to China and popularized among scholars, practitioners, and educators. In the past 10 years, along with various OER projects ,China has been actively committed to construct high quality open education resources, in order to satisfy more people to study in anytime as far as possible. 10 years has passed, how far has China moved forward in this global OER movement? This paper is organized as follows. In next section, we briefly introduce the previous research in the field of OER in China. Then research method and process will be presented. Thereafter, results are discussed with a number of implications and conclusions, visual tables and figures attaching. Finally, limitations of this study and implications for future study will be discussed.

Related Research

Research Content of Open Educational Resources

In 2002, the ideas and concepts of OER “Open & Sharing” gradually introduced to China, and then OER quickly won popularity in China. From the international point of view, organization and implementation of Open Educational Resources consist of five aspects contents, which are Open Standard & License, Open Source Software, Open Course Management System, Open Access Content and Open Sharing Consortium (Albright, 2005). Based on the literature review, we find that there has not been a unified international standard for OER movement, so that different countries hold different standards, leading communication barriers between different countries. From the perspective of China, educators do some researches about OER. About the research content, they also can be distributed into five parts; they are Open standards, Open resource platform, Open content, Teaching and Learning under the OER environment and Management& Evaluation (Figure 1.).It is the implementation framework for Chinese OER movement.

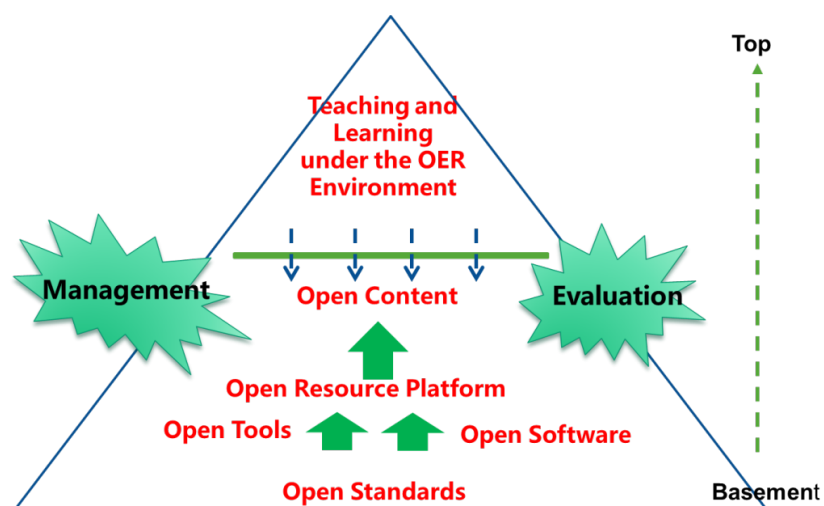


Figure 1. Research content framework for OER in China.

Research Method for Open Educational Resources

As for research method, throughout all of the academic articles in China, we found that they were mainly descriptive study, such as introduction of foreign projects, lacking of exploring and interpreting study. There was no experimental study and design study. Only one researcher, Meijing Wang (2012), has done a research to explore the research situation about OER field in China. Based on the data of journal articles, she used bolometric method about the whole production, research content, researchers' workplaces and areas. Then she concluded that the research of OER in China was still in a low level.

Research Methodology

Method

Citation analysis is a tool in journal evaluation. As a communications system, the network of journals plays a paramount role in the exchange of scientific and technological information. (Li & Li, 2012) Although journal articles themselves can reflect general situation of a field, reference articles can reflect the exchanges among scholars better, which is a way to inherit and develop among different articles. Research trends can be emerged with the method of citation analysis as well.

Compared with bolometric method, which cannot reveal the relationship, social network analysis (SNA) is a method that is used to describe the relationships and structures among different groups. The parameters of social network analysis, such as centrality, density, central potential and factions, can reasonably characterize the interactions of different institutes and authors. In view of the above advantages, we choose social network analysis method to do citation analysis. Network density analysis is adopted to acknowledge the relationships between different papers and the frequency of inter-citation. Degree centrality is adopted to identify the key researchers working actively in the field of OER and the most cited papers. In addition, research subgroups are examined by cohesive subgroup analysis.

Sample and Research Process

Key word searches were made in the database of the China National Knowledge Infrastructure (CNKI) (See Table 1 below). Search time ranges from January 1st, 2002 to December 30th, 2012.

Table 1

Specific Search Method

From Title="Open Educational Resources" &"OER"
 & From Key Word="Open Educational Resources" &"OER"
 & From Title="Open Course"
 & From Key Word ="Open Course"

OER articles published between 2002 and 2012 were selected and in total there are 97 academic papers. (Data acquisition time: 25th January, 2013) We eliminated the seven dissertations, leaving 90 journal papers. After statistics, 133 articles including citations were treated as the research object and symmetry of the adjacency matrix was established. Part of the matrix is as follows (see Table 2).

Table 2

Parts of the matrix

	①	②	③	④	⑤	⑥
①	0	1	1	1	1	1
②	0	0	0	0	0	0
③	0	0	0	0	0	0
④	0	0	1	0	0	0
⑤	0	0	0	0	0	0
⑥	0	1	0	0	0	0

The first line and the first row means serial number of all articles. “1” in the second line and third row means number 2 is the reference of number 1 article, “0” means the article is not the reference of any other articles.

We made a statistic of the 133 articles according to publish years. (*Figure 2*) Although the research of OER derives from 2002, but only one paper was published.

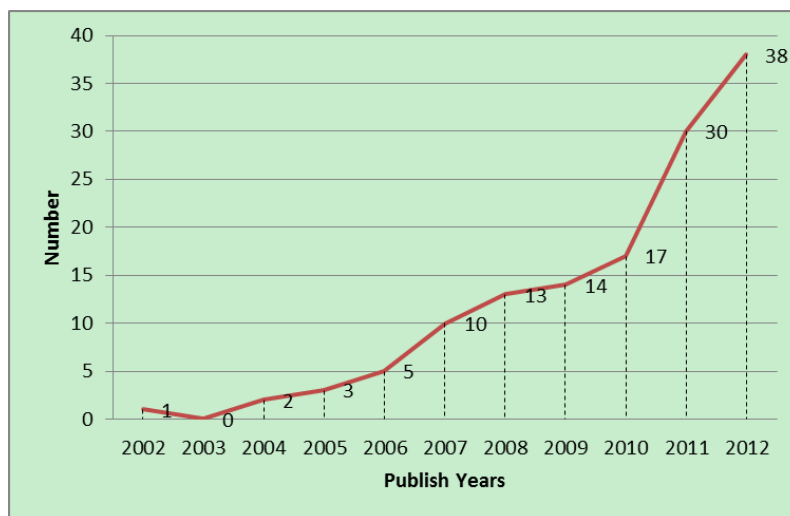


Figure 2. Statistic of articles from 2002 to 2012.

This research adopted research tools: Microsoft Excel 2010, Social network analysis software UCINET and visualization tools NETDRAW.

Research Results

Institutions

We distributed the institute of the researchers of the 133 articles. (See Table 3 below)

Table 3

Institutions of Researcher

Item		Number	Percentage
College	Comprehensive University	72	40.68%
	Normal University	69	38.98%
	Vocational Colleges	3	1.70%
Primary and Secondary Schools		1	0.57%
Radio and Television University		15	8.48%
Periodical Office		4	2.26%
Nonprofit Organizations		4	2.26%
Foreign Colleges or Organizations		9	5.09%
Total		177	100%

According to the statistics, comprehensive university and normal university produce the most OER journal articles, reaching 79.66%, which indicates that they play an important role in the field of Chinese OER field. The second is from radio & television universities, 8.48%, which is still lower than comprehensive and normal universities. We found that some companies, which lead the trend of OER in China, don't publish any articles, indicating that they take part in the practice rather than research.

Whole Characteristics for Citation Network

Density.

Density is one of the most commonly used measures in the social network analysis, which means the relationship tightness among each network node. When density is high, the influence is significant in the network. (Ge Song., 2012) In the citation network, density can reflect the reference frequency among articles. According to the research data, we conclude the density of citation network is 0.0132, which is lower than general level. It indicates that, in the Chinese OER field, it is not common to refer to each other; the research for OER is still at a beginning stage, which is far from mature stage. See the socio-gram that follows (Figure3). We can observe several scattered points and isolated points.

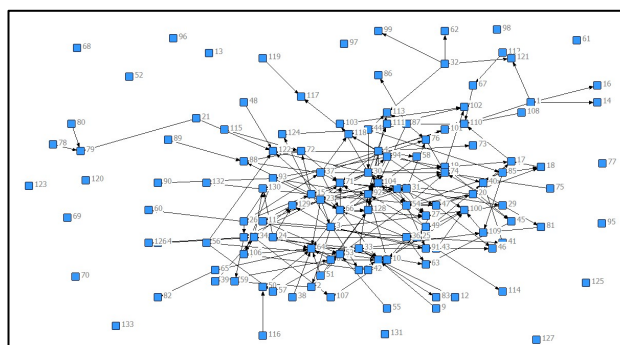


Figure 3. Socio-gram.

Center Degrees for Articles

Degree centrality is an index for local node centrality, which reflects the node exchange with others to some extent. Usually, degree centrality is measured by in-degrees and out-degree. In citation network, when the node is the article, node degree centrality will reveal which article is the most influencing; when the node is the author, we can judge the core researcher in the field of OER.

Table 4

Top Six In-Degree Articles

Number	Title	In-degree	Out-degree	Publication Year	Author
30	Review of MIT Open Course Ware Movement	15.000	1.000	2004.10	Xinfu Ding, Long Wang
4	International Higher Education Present Situation, Problems and Trend of Open Courses	15.000	0.000	2008.1	Yimin Jia
15	International Expansion of Open Courseware Movement	9.000	2.000	2006.8	Long Wang, Xinfu Ding
23	Development, Application, Collaboration and Sustainability——OER Conference Interpretation 2008	8.000	6.000	2009.2	Long Wang
7	Retrospect and Prospect: The Seven Year Itch of Open Educational Resources	7.000	6.000	2009.2	Long Wang
28	MIT Open Course Ware: A Innovation Perspective	7.000	2.000	2008.1	Long Wang

In-degree means this article is referred the most times, in the opposite, out degree means refer others' the most times. (Shunping Wei, 2010) In the table above, we list the top six in-degree articles, which showed the most influencing articles in Chinese OER field: Written by Ding.X.F & Wang.L, Review of MIT Open Course Ware Movement, is the most widely referred. The core researcher in the field of OER is reflected by the most influencing articles. Six of the articles were written by Long Wang, who was treated as the core researcher.

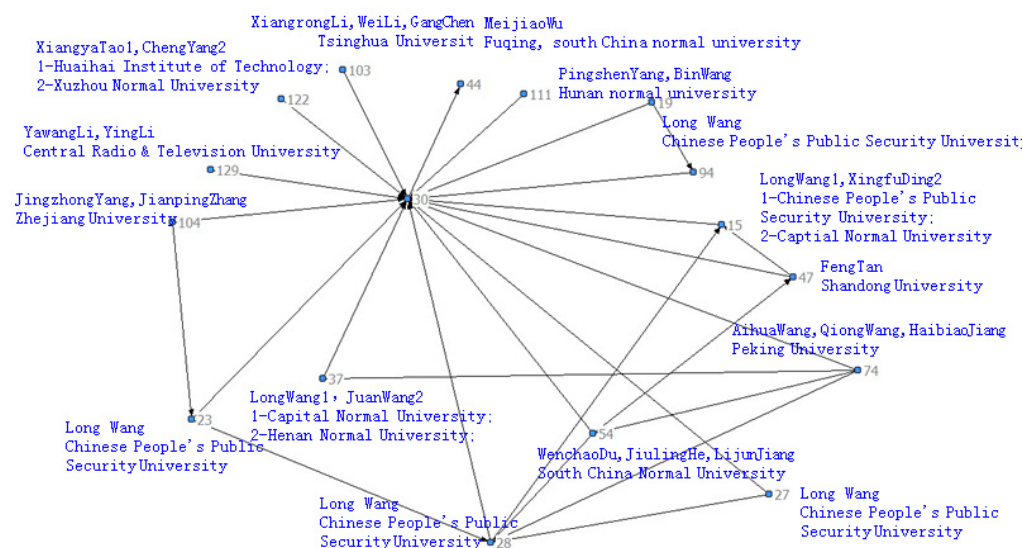


Figure 4. Cites relationship of review of MIT Open Course Ware Movement. From the figure, we find that six of the fifteen articles are wrote by Long Wang, the other nine articles are wrote by different writers, who come from different institutes. No significant collaborative teams.

Betweenness for Article.

The concept of betweenness was put up by different scholars, however the common features of betweenness is the indicator to measure the medium nodes in the network (Liu,2004) In citation network, if an article has a high betweenness, then it means to play as a role of bridge in other academic communication .

Table 5

Betweenness Top Five For Article

Nu	Title	Betweenness	nBetweenness	Publication Year	Author
7	Retrospect and Prospect: The Seven Year Itch of Open Educational Resources	63.433	0.367	2009.2	Long Wang
30	Review of MIT Open Course Ware Movement	43.500	0.252	2004.10	Xinfu Ding, Long Wang
15	International Expansion of Open Courseware Movement	35.967	0.208	2006.8	Long Wang, Xinfu Ding
23	Development, Application, Collaboration and Sustainability——OER Conference Interpretation 2008	33.900	0.196	2009.2	Long Wang
47	The Success Way of MIT for Chinese National Excellent Course	33.167	0.192	2008.2	Feng Tan

In Table 5, we list five articles which betweenness are in the top five. We choose Number 7, Retrospect and Prospect: The Seven Year Itch of Open Educational Resources, as a case to analysis the specific relationship. We

found that high Betweenness will promote an article to be core article.

Scattered nodes.

From the Socio-gram, we can see some scattered nodes. We choose node 1 and node 79 as example.

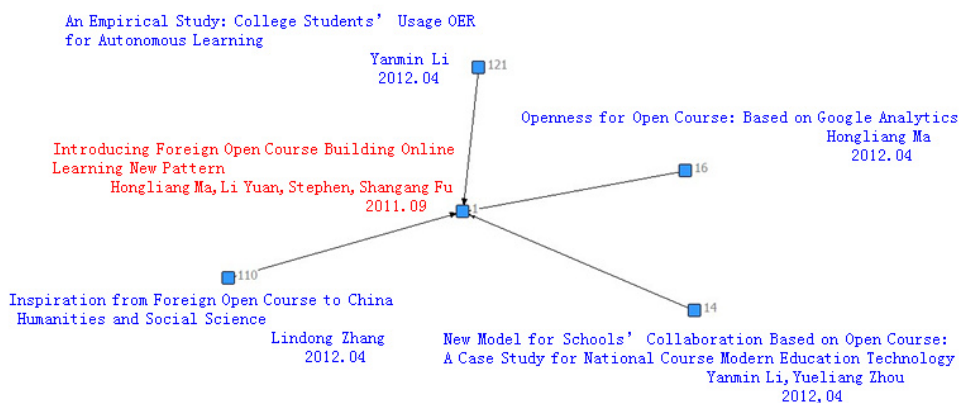


Figure 5. Cite relationship of Node 1.

Node 1 article Introduction Foreign Open Course Building Online Learning New Pattern, published in 2011, introduced the practice application of an open course from Bolton University to Shanxi Normal University. Article 1 was referred by Article 14, 16, 110 and 121. All these four papers adopted empirical study.

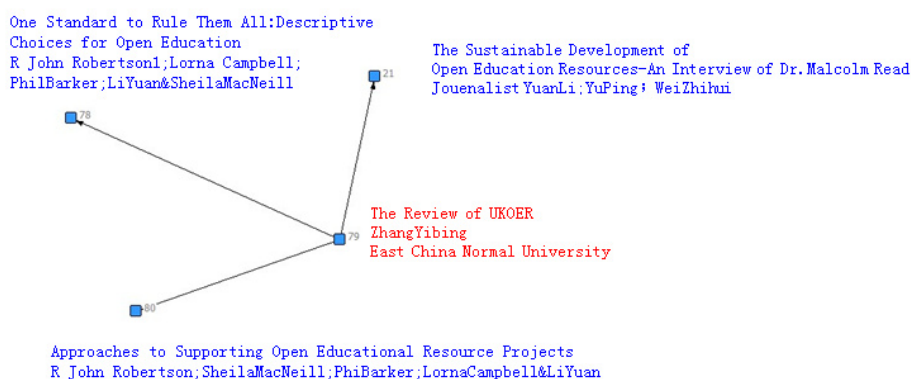


Figure 6. Cite relationship of Node 79.

Node 79 article The Review of UKOER referred the other three articles. Based on the content analysis, we found that though it introduced the first national OER project, it paid more attention to the rules and teaching & learning laws under OER environment.

Cohesive subgroups.

Cohesive subgroups represent a closed group in a team. In sociological research, social cohesion plays an important role, especially in the explanation of social phenomenon, such as social solidarity and herd mentality. From different angles, cohesive subgroups have different concepts, including clique, k-Plex, and components. In this research, based on the reciprocal relationships, we find that the large clique is three nodes, which means there is no small world in the field of OER and the transfer stop after two times. In addition; there are totally 14 cliques with 3 nodes and 3 cliques with 4 nodes in the citation network among 133 nodes (Table 6).

What is the specific relationship in a small clique? We choose one of the cliques as a case to make visual analysis. See Table 6.

Table 6

A case of clique analysis

Clique	Articles number	Figure
1	14;77;81	
2	14;77;82	

From the figure, number 14, 77, 81, 82 four articles have the similar research content. We can conclude that the number 14 article is the medium and its academic value is recognized, otherwise article of number 77 can refer number 81 and 82 directly.

Conclusions

Since there was a lack of such empirical research in a Chinese context, this paper can provide contextual basis for future researches as well as practical implications for OER practitioners.

We can draw the conclusion according to the research as following. First, the comprehensive university and normal university produce the most articles. As the practice institutions, Radio & Television University change to pay attention on OER research. With the development of Open University, more teachers from radio & television universities join the research. Meantime, we expect more companies, which lead the tide of OER practice in China, can participate in the research so that a bridge between the theory and the practice will be built.

Second, cited frequency and bridge function enable journal articles to be core articles. As a new or a layoff for OER research, we can pay much attention to the six core articles. As the frequency of reference is low and academic circle

of OER in China is small, leading to restrict innovation.

Third, the number of published papers and intermediary bridge enable a researcher to be the core researcher. There are a number of active researchers, while because of no significant relationship between reference articles' authors, there is no research team. It is a suggestion that we should increase cooperation.

Four, currently, most of OER research is still descriptive research. Some research of application is proceeding in. As the research of Chinese OER is still in at begging stage, so that more research questions in OER need to be explored in order to construct high quality and more influencing open content, achieving the deep openness.

Limitations and Implications for Future Studies

As with all research, we acknowledge some limitation in this study that should be considered. First, we have paid much attention on the journals paper in China, which ignored the foreign journals. However, the development of a discipline cannot be separated from domestic and foreign research. Second, we only analysis the simple relationships of current OER research, in fact ,there are many complex relationships in micro perspective.

Note that, we plan to enrich the research content in the future from two aspects, first, increase the research content, form macro and micro perspective, to reveal more phenomenon and discipline for OER research in China to give more suggestions for educators and practitioners. Second, focus on the foreign articles that referred by Chinese scholars, absorbing excellent experience from other counties.

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