A visualization analysis of poverty alleviation through education research in China

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Abstract: In light of the education situation and anti-poverty goals, Chinese scholars have discussed poverty alleviation through education widely and deeply. Due to the new development period, it is urgent to have large-scale research on poverty alleviation through education. The study adopts a quantitative analysis with visualization software Citespace 5.0 to analyze 363 papers in the CSSCI database, which reveals the research themes and topics, contribution of authors and article, and evolution features from 1999 to 2018. The visualization mapping indicates the research field has gone through three stages including the preliminary period (1999–2003), exploration period (2004–2012), and innovation period (2013–2018). We advocate more researchers and academies participate in theoretical and methodological analysis, as well as the multidisciplinary and multidimensional value in post-era research. It can be concluded that government leadership has a significant role, but lacks pointed and individual perspective.

Subjects: Educational Research; Research Methods in Education; Sociology of Education

Keywords: poverty alleviation through education; educational development; visualization analysis; hotspots

1. Introduction

Poverty is an officially recognized phenomenon all over the world. The serious social problems brought by poverty should not be overlooked. People of all nationalities in the world have been committed to fighting against poverty for a long time. It is of great theoretical and practical
significance to solve the problems of poverty, relating to sustainable development and the ultimate destiny of mankind. There are many factors causing poverty. At first, it is only regarded as an economic phenomenon that household income is not enough for daily life (Y. Liu et al., 2017; Ward, 2016). Along with research going deep, the causes of poverty expand to be multidimensional, including deprivation of education, medical and housing needs (Alkire & Santos, 2014; Bossert et al., 2013; Fan et al., 2015; Liu & Xu, 2016).

The United Nations (UN) has long been concerned about the problems of poverty. Among the Sustainable Development Goals (SDGs) adopted in 2015, “eliminating all forms of poverty” is the primary goal. Poverty reduction policies are considered as a priority development strategy in many developing countries. They have taken steps to poverty reduction and made remarkable achievements. According to statistics, the number of extremely poor people living on less than US$1.90 per day in the world has changed from 1.8 billion in 1990 to 776 million in 2013 (World Bank, 2017), reducing the incidence of extreme poverty by less than 11% (Human Development Report, 2016).

China, as a representative of developing countries, is faced with a long process of hard work to eradicate poverty. When the New China was founded in 1949, the civil was struggling in gaining food and clothing to keep survival needs, the government vigorously developed rural education to eliminate illiteracy among young and middle-aged people. Until 1984, The Notice for Helping Poor Areas to Change Their Faces as Soon as Possible was promulgated, it firstly proposed a notion which called Alleviating the Poverty of Education to manifest a relationship of education and anti-poverty. The notion ensured its institutional status in top-level policy design which also means poverty alleviation through education was in the process of forming. Since then, China promulgated successively several policies about improving people’s cultural qualities in remote and rural areas. The specific measurements included technical training, popularization of primary education and scientific popularization in remote areas. But China still had a relatively vague target for resolving poverty problems through education.

When it comes to 21th, China has actively explored a poverty reduction path with Chinese characteristics, carried out systematic, massive, various forms of education and poverty alleviation campaigns. So that scored remarkable achievements in poverty reduction were made. Statistics showed that 70% of the world’s poverty reduction is contributed by China (White Paper of Poverty Alleviation: China's Experience and Contribution, 2021). The number of impoverished people fell to 5.51 million at the end of 2019 from 98.99 million at the end of 2012 (The State Council Leading Group Office of Poverty Alleviation and Development, 2020). The success of China’s poverty alleviation is due to effective institutional reforms and innovations (Y. Liu et al., 2017). At present, in order to consolidate the achievements of poverty reduction, the Chinese government is implementing a policy, which is the so-called “The Targeted Poverty Alleviation”. The goal is to completely eliminate extreme poverty in rural areas by 2020, 10 years ahead of the Sustainable Development Goals (SDGs).

Over the years, China has attached importance to the function and role of education in poverty alleviation. By studying China’s achievements of poverty alleviation through education, it can promote international academic exchange to share experience in financial assistance, skill training, and so on for the poor. At the same time, this research will play a role in guiding and improving relevant policies to reach new targets. Furthermore, understanding the current situation and trend on the field is beneficial to continue scholars’ research to deepen the theory and practice.

The main objective of this paper is to have a thorough understanding of poverty alleviation through education research in China from 1999 to 2018. The hotspots and dynamic change are analyzed to represent comparatively intact research results. This article will be organized as follows. Section 2 introduces the 4 main areas and related achievements of poverty alleviation through education research in China. Section 3 explains the theoretical basis of Citespace5.0 and the specific process of the research. Section 4 provides analysis of results, including the distribution
of publication cycles, research authors, institutional cooperation, and the citation rate of papers, etc. Section 5 concludes with an in-depth discussion of this work. The last section summarizes inspirations and outline some recommendations.

2. Literature review
As China's efforts to reach the goal-building a moderately prosperous society in all respects is well underway, the absolute poverty population will be eliminated by 2020, and targeted poverty alleviation has gradually entered the final stage. The central government has reached a mutual understanding that education plays an increasingly prominent role in poverty eradication. Chinese scholars start to research how education work to eradicate poverty, how to improve education quality to change human life. A wide variety of theoretical and practical research is emerged to deepen the research. The following are four main research areas about poverty alleviation through education.

2.1. The policy research of poverty alleviation through education
By recognizing and defining poverty alleviation through education, researchers find features and significance of policies. Meng Zhaohai (2016) brought up a subject that the essential purpose of poverty alleviation through education is to increase the human capital of impoverished people and increase their social competence. Therefore, policies incline towards individualism, structuralism, and relationalism, which is conducive to policy sustainability. Yuan Liping (2019) believed education is a key element in China’s comprehensive poverty alleviation. China’s policies of poverty alleviation through education have established a relatively completed system in terms of value orientation, action positioning, and working mechanism. The system has stimulated the endogenous value-justice, collaborative innovation and subject consciousness. Song and Yuanhang (2019) took a perspective of policy tools with text analysis in the new era, which showed China's policy system of targeted poverty alleviation through education is integrally formed as part of state affairs. But the supply relationship in specific areas is relatively fuzzy and the subject of participating in poverty alleviation is single. Assuming the perspective of policy operation, Huang Chenchen (2019) constructed a rights-technology-organization integrated framework. One was improving educational conditions to alleviate educational poverty shifts towards depending on education to alleviate poverty. The other was the transition from inclusive poverty alleviation through education to targeted poverty alleviation through education. That will lay down a good foundation for the government to reduce relative poverty in the next stage (Yuan Liping, 2019). All the optimal policies have gradually improved in continuous revision, provided that their deficiency is recognized. Tongwei and Yuting (2019) spotted some problems that need to be solved. For instance, institutional education poverty caused by urban-rural dualistic structure, regional education poverty caused by differences in regional education investment, or hierarchical education poverty caused by the huge differences in the individual growing environment.

The success of the research area is showed in two aspects, one is to demonstrate the importance of poverty reduction in education, the other is to be the evidences for the policy designing. However, having sufficient policy information and research paradigms will be the challenge in the future.

2.2. The theory research of poverty alleviation through education
Lin Chengdong was the first scholar who put forward the theory of poverty alleviation through education in 1997. Arguing that education has the function of anti-poverty and can help the poor to cut off the vicious circle of poverty. At the same time, the realization of the anti-poverty function of education needs to meet four conditions: (1) the improvement of comprehensive quality of the population in poverty-stricken areas; (2) a relatively fair economic distribution system; (3) the improvement of the combined rate of the poor’s labor force and factors of production; (4) the capital accumulation and investment. Some scholars pointed out that the cause of poverty was a vast shortage of knowledge and ability. Education can not only strengthen poor people's ability to get rid of poverty, but also bring considerable social benefits (Yan Wanyue, 2006).
Poverty alleviation through education is not simply an educational issue, but an economic, sociological, and ecological issue. Based on multiple theoretical views, the field has different conclusions and expands the breadth of theory. In economic terms, poverty alleviation through education is a special social public product, social security system improves the education level of the poor and lifts them out of poverty (Nengliang & Peng, 2002). From a sociological point of view, the use of human factors to study the function, role, and significance of poverty alleviation through education have become the academic tendency (Mingyu & Hong, 1993). As for a diverse perspective, education, which mainly refers to elementary education and vocational education assists educational immigrants and ecological immigrants who live in the poor ecological environment to adapt to the new environment (Zhang Xuemin, 2001; Yu Zuguang, 2007).

In the long term, poverty alleviation through education can promote local economic, improve the income level of the poor, and increase the proportion of education investment (Zhou Lisha, 2011). China’s poverty alleviation through education is guided by a series of political ideology, that is to cure the ignorance before curing poverty, to improve willpower before alleviating poverty, and to attach importance to education. Besides, the core ideology of poverty alleviation through education has gradually shifted from pursuing the fairness of accessibility to process (Xingzhou & Zhenliang, 2018).

In conclusion, the theory research of poverty alleviation through education succeeds in realizing education is of great significance for poverty reduction in theoretical level. Besides, perceiving the explanation for education-technology-capital, which is a favorable condition for government to regulate and control their relationships. While, the most challenge is the theories lack originality.

2.3. The mechanism research of poverty alleviation through education
Among the long theoretic studies and discussion on policy, the operational mechanism of poverty alleviation through education has gradually become clearly. The deviation between policy practice and policy objectives is an issue that needs attention (Shi Lelei, 2020). The “habitual exclusion” mechanism, the “weak accumulation of resources” mechanism, the “resource restriction” mechanism, and the “formal governance” mechanism based on the latitude of the family, school, society, and government are the main causes for the deviation in poverty governance. It is easy for a governance body to lack social responsibility, to dilute management style, and to distort the performance results in the “project-based” poverty alleviation through education operation mechanism (Huang Chenchen, 2018). Therefore, the “school-enterprise linkage” model is an effective attempt that should be implemented in actual operations. Enterprises with funds and practical experience can be connected to universities having excellent teaching resources and professional research teams to build a bond of high-quality education resource sharing between poverty areas and developed areas. This cooperation model provides a sample for China’s education poverty alleviation work (Xingtao, Lijia & Huidan, 2019).

Apart from the above mentioned in a macro and middle view, other scholars have discussed the mechanism in a micro view. A field data statistics of 1542 poor households in 20 villages in a province applying to an orderly logit model showed that optimizing resource allocation, improving the grass-root governance, and monitoring the performance accurately can foster the trust of the poor (Haotian & Lili, 2020).

Different mechanism models illustrate the effect and function of education in reducing poverty. Moreover, the mechanism is an advantage to be extend to other fields.

As for the challenge, mostly derived from insufficient theory basis and low-efficient of organization and groups.

2.4. The post-development goal research of poverty alleviation through education
In the post-poverty alleviation period, long effectiveness, and complexity of education, poverty alleviation through education should move towards a normalized and institutionalized direction.
The country is responsible to implement comprehensive measures, build an educational community, and carry out policy evaluations to strengthen the coordination of education and rural poverty (Xiaoyu & Xingzhou, 2020). Beyond that, the quality effect of information will become one of the crucial considerations in the post-poverty era. By tracking the real-time changes of policy information, to explore whether education effectively covers relatively underdeveloped areas and relatively poor people. The purpose is to make sure that education can accelerate social mobility and construct social equality (Jia & Jierui, 2020). Similarly, with technology, block data is a potential educational tool for poverty alleviation to integrate educational ideas, concepts and measures for poverty alleviation in the future (Yuan Liping, 2020). The goal of poverty alleviation through education has changed to eliminate capacity poverty (Xiaorong & Xiaomiao, 2020) and develop social capital (Liping & Jiawei, 2020a). The elimination of capacity poverty is mainly concentrated in rural areas, strengthening the regional system function and humanism spirit. And the development of social capital is mainly concentrated in ethnic areas, hoping human capital is organically embedded in social capital through trust, regulation, network, and cooperation. It is obvious that scholars have consciousness to incorporate educational technology into poverty alleviation, but lack clear and definite goals.

The research of poverty alleviation through education in China is relatively abundant and comprehensive in general, which is of great significances for recognizing the specific content. However, by the end of eradicating poverty, those studies lack integration with visual presentation. How research results changed as time went on and what the relationship between them still leave much space. Driven by this concern, this article adopts a quantitative analysis to seek a full-scale to summary the present research in-depth, which is expected to reveal the research themes and topics, contribution of authors and article, and evolution features.

3. Methods

3.1. Methodology
Citespace (Chen, 2006, 2004) is a quantitative analysis tool designed based on co-citation and pathfinder algorithms on JAVA, which theoretical foundation is mostly derived from Structural Holes Theory (Burt, 1992, 2004) and Information Foraging Theory (Pirrolli, 2007). The Structural Hole theory shows that not every person has a direct connection with other people in social networks, and due to the structural constraints of the flow information, individuals are exposed to different information content, and the time to pass and receive information is different. Therefore, the structural hole is equivalent to a set of clusters, helping us to know the relationship of clusters. Specifically, the theory is embodied in Betweenness Centrality, that it not just comprehends the contributions of the literature, but identifies the role of nodes in the entire network. As for the Information Foraging Theory, it can be explained to make decisions for obtaining the maximum results at minimum costs in information-seeking. If a scholar finds a problem is being studied, then the research risk will be greatly reduced to increase research efficiency. By using bibliometrics analysis of literature in specific field, Citespace explores the critical path and inflection point of knowledge, then is carried out on drawing of a series of visualization maps to form a potential dynamic mechanism in the evolution of the subject and advance the frontiers (Garfield, 1955; Kessler, 1963; Small, 1973).

3.2. Research setting and data collection
The first step is to choose the Chinese Social Science Citation Index (CSSCI) as the document database, the chief reason for this choice is that CSSCI follows the rule of bibliometrics, displays the very strong academic value and academic maturity to help our research explain the issue clearly. It plays a dominant role in Humanities and Social Sciences in China. Then search for a relevant topic by selecting keywords “education” “poverty” “poverty alleviation through education” and “education for poverty alleviation” from 1999 to 2018. After reviewing, screening, and re-checking the titles, abstracts, and keywords of the literature, 363 academic papers that meet requirements are selected as the data set of the research. They all involve sufficiently specific
information including authors, institutions, keywords, and references. Input all the literature information to the software by the regulations to prepare for analyzing the corresponding high-frequency vocabulary, core author, and research institution.

4. Results

4.1. Descriptive analysis of poverty alleviation through education publications

The time distribution of knowledge domain research is presented in Figure 1, which shows the basic research overview in the field. In the beginning, scholars focused on poverty eradication in economic way, but since the end of the 20th century, the Chinese government aimed to solve problems of food and clothing for the poor in rural areas, relying on technological progress to improve the quality of farmers. After that, the conception of poverty alleviation through education was created by Lin Chengdong in 1997, who first pointed out that education plays a key role in alleviating poverty, which can cut off the vicious circle of poverty. Chinese scholars began to study the function of education in poverty alleviation. While only a small number of papers discussed the issue from 1999 to 2004, and the number maintained around 10, but then, it had a miniature peak in 2005 with the number of 30. During that period, the Chinese government issued a white paper titled “The Development-oriented Poverty Reduction Program for Rural China (2001–2010)”. Under the leadership of the government, the poor farm and the whole society make efforts to participate in poverty alleviation actions, and gradually formed a multi-subject, large-scale poverty alleviation pattern. Scholars have begun to research the topic from other social perspectives.

After this short period, the number of research papers was decreased to 10. Until 2013, the important “targeted poverty alleviation” strategy was launched. It refers to a poverty alleviation measurement that uses scientific and effective procedures to accurately identify what is the type of the poverty, how serious the poverty and give detailed solutions to help them to get rid of poverty. In other words, Chinese government establishes poverty information files for each poor population to solve poverty problems in a targeted, effective way. At the same time, emphasis on the importance of education to continuously alleviate poverty, scholars started to pay much

![Figure 1. Distribution of poverty alleviation through education publications in China: 1999–2018.](image-url)
attention to the diverse research about poverty alleviation through education, thus the number of publications increase rapidly getting to the top of 60 in 2018.

4.2. The Co-occurrence of authors and research institutions

Based on the common view spectrum of institutions of poverty alleviation through education research, we can have an insight into the research status. The automatic display of the number of articles published reflects the academic research ability of scholars to a certain extent. Zhang Yongli has published 5 papers, is the scholar who has the most articles in the field. Scholars ranked 2nd to 5th are Shi Zhile, Zhang Qi, Zhao Maolin, Liu Weibing, and Ren Youqun, they all have published 4 papers separately these years. The last four scholars, Chen Quangong, Li Xingzhou, Wu Xiaorong, and Xu Fenghua have published only 2 articles.

An analysis of the co-occurrence of scholars is showed in Figure Figure 2. Selecting the time interval “1999–2018”, node type “institution”, and the threshold to top 50 per slice. We finally get the scholars map with 34 nodes, 15 links, density 0.0267. The nodes are ring-shaped. The larger the nodes, the larger the font of authors, indicating that the overall frequency of the author is higher. However, nodes are too small to see clearly, which implies the overall frequency of authors is very low. The lines that connect two or more authors mean they have cooperation in one paper. So, only a few scholars have worked together in one paper. For instance, Zhang Qi and Shi Zhile often collaborate, Zhang Yongli, Liu Weibing, consisting of a small group to do the research. But most of the authors only have simple connections with others, and about 1/3 authors do not have any connection. Thus, the cooperation is insufficient, such a phenomenon is not beneficial to future research.

In addition to the cooperation of scholars, collaboration among institutions also shows the aspect of the research field. Poverty alleviation through education in China is mainly concentrated on 10 institutions, which are 6 universities, 3 institutes, and 1 government organization (Figure Figure 3). In fact, except for the School of Education of Central China Normal University publishing 3 papers, other institutions have published 2 articles respectively. The only strong node also belongs to the School of Education of Central China Normal University, the rest nodes are too weak to see clearly. Because poverty alleviation through education is not only a matter of education, it is more likely to be connected with social problems, that is why some universities...
and institutes about economics and sociology have an essential role in the field. Meanwhile, an interdisciplinary perspective has an advantage for the quality of research. It is worth to notice that every institution is isolated, scattered relatively, with no connection. As a result, more and more disciplines are urgent to strengthen the density of the research. Research institutions should work together to integrate resources to get high-level.

4.3. Classic literature: Analysis of turning points
Nodes are points where the lines cross between different networks, which normally act as “bridges” between different clusters. They include common nodes shared by two networks and nodes linked between networks, so their centrality and citation frequency are relatively high. The turning points in networks grasp the classic literature in this field. In this part, we select cited reference for the node type, the time slice (Year Per Slice) for 1 year. To ensure the clustering effect, setting TopN% to 50%, which is the 50% term with the highest frequency per year or Literature. After repeated adjustments, the threshold is set to (2, 2, 20) (4, 3, 20) (2, 2, 20). Then running Citespace5.0, we get a co-citation network (Figure 4), which has 68 nodes, 192 connections, a network density of 0.0843, a Modularity Q value of 0.6785 (required>0.3), and...
a Mean Silhouette value of 0.5731 (required>0.4). The structure of the co-occurrence map is remarkable and the credibility is high.

The 10 turning literatures are presented in Table 1 and Figure 4. Xie Junjun (2012) was the first to summarize the current situation of domestic poverty alleviation through education. He pointed out that there were economic, sociological, and problem-oriented ways to illustrate the function of poverty alleviation through education. However, the scale of this research is too narrow, considering poverty is a comprehensive issue, it needs to be explained in all aspect, like the mechanism how poverty generates, what causes it, and how to alleviate it. Such a system view would think deeply about how educational structure fits the social structure, how to maximize the value of the educational function. Therefore, taking a micro perspective to assist the poor to meet their basic needs (survival skills, living conditions, humanistic care) is imperative. The biggest educational contradiction in poverty areas is that the education costs and educational

| Author                     | Year | Title                                                                 | Cited frequency |
|----------------------------|------|----------------------------------------------------------------------|-----------------|
| Wang Jiayi et al.          | 2016 | Education and Targeted Poverty Alleviation                          | 16              |
| Zeng Tianshan              | 2016 | Accurately Promoting Poverty Alleviation Efficacy with New Ideas and New Mechanism | 7               |
| Zou Wei, Zheng Hao         | 2014 | Why Don't Children from Poor Families Go to School: Risk, Human Capital, Intergenerational Transmission and the Trap of Poverty | 7               |
| Li Xingzhou                | 2017 | Equity and Justice:The Value Pursuit of Poverty Alleviation through Education | 7               |
| Xie Junjun                 | 2012 | A Review of the Research on Educational Poverty Alleviation          | 7               |
| Wu Ni, Wang Xuenan         | 2017 | Development Characteristics of Education Poverty Alleviation Policy Since the 18th CPC National Congress | 6               |
| Meng Zhaohai               | 2016 | Theoretical Basis and Prerequisite of Poverty Alleviation Policy by Education—International Experiences and Native Reflections | 6               |
| Liu Junhao, Xu Fenghua     | 2016 | Education Assistance: From “Alleviating the Poverty of Education” to “Poverty Alleviation through Education” | 5               |
| Dai Ruihua, Yu Xuan        | 2017 | Targeted Poverty Alleviation of Education: Plight and Path           | 5               |
| Zhang Qi, Shi Zhile        | 2017 | Research on Innovation and Practice of Educational Poverty Alleviation Policy in China | 5               |
opportunities cannot meet the educational needs. To promote the poor's life in poverty areas, the government should reform the tax and fee system to relieve the family's burden, and raise more money to encourage students to continue their schoolwork.

**Data source:** the Output of Citespace5.0

After Xie Junjun’s initiative, Zou Wei and Zheng Hao (2014) adopted a micro model of human capital transmission between generations to prove that risks and decisions in education investment affect low-income households. The premium cost caused by high-risk decisions weakens the investors’ expected return. Low-income families tend to choose conservative, low-risk, and low-expected income projects. Without much profits, people strengthen their investment behavior to engage them in a poverty trap. When the decision-making principle comes to the education-decision, compared with high-income family, when there is no risk, the risk premium becomes an additional cost, which is not likely to invest more on their children's education; when there is a risk, the opportunity cost of education and the uncertainty of future benefits affect education-decisions. So that risks make it easier for low-income families to give up children's opportunities to receive an education. Zhou Wei and Zheng Hao take good advantage of microdata, average education level, enrollment rate, unemployment rate, age, and gender household size to illustrate the importance of education-decisions for the children and their parents.

Liu Junhao and Xu Fenghua (2016) clarified the concept of poverty alleviation through education. There are two aspects of the connotation of poverty alleviation through education. One is “alleviating the poverty of education”, which means education is the goal, task, or content to eliminate poverty; the other is “alleviating poverty through education”, which means education is a measurement, tool, or way to eliminate poverty. Two aspects are the dual attributes of poverty alleviation through education, that cannot be separated. As an activity of cultivating people, the final goal of education is to make people grow ability freely and comprehensively. In this sense, poverty alleviation and education share the same value pursuit. Therefore, humans become the connection between education and poverty alleviation. The research gives scholars a new sight to consider the deep meaning of poverty alleviation through education.

Wang Jiayi et al. (2016) indicated that the Chinese government should take several educational measurements to ensure the best effect of eliminating poverty. For pre-school education, the enrollment rate was much below 75% in 2015 (Ministry of Education of the People's Republic of China, 2015), so expanding resources to universal kindergarten education in rural areas is the priority. As for the nine-year compulsory education, the allocation of educational resources is unbalanced, especially for those poverty regions. Facing the poor condition of running schools, small-scale schools, and micro-schools. It is difficult for schools to operate and it is hard for students who live far away from school to enroll nearby. Based on the above difficulties, making efforts to satisfy students’ studying situations, improving the integration of urban and rural resources may be the key to solve problems. In terms of high school education, the aim is to set up special funds to promote the quality of high school. Meanwhile, cultivate the ability of each school to have its characteristics. For vocational education, relying on vocational schools to provide students with basic survival skills and provide skills training for the local unemployed labor force to make them get rid of poverty. The last part is the university, adjusting to the needs of economic and social transformation, striving to cultivate innovative, application-oriented, and interdisciplinary talents are effective ways for higher education to serve people living in poverty-stricken areas. Meng Zhaohai (2016) also cared about how to achieve the goal of "The Poverty Alleviation through Education Policy". The willingness to invest education, the structure of school, and the labor market are the three factors that affect poverty. The cost and risk of receiving education at school become more and more, the poverty household is not willing to send their children to schools, so the Chinese government can provide more funds with those poor students. The shortage of teachers and bad condition of school often have a bad influence on students, which make them cannot fit the culture, psychological characteristics. Reforming the structure of school and
launching different programs to enrich students’ life are useful, but the more important is to help them adapt to the environment. To achieve the target, student employment quality must be taken into consideration. Unfortunately, due to the dual segmentation of the labor market, the graduate students who come from poverty areas do not have a good chance to diverse to the main labor market, they may find it very hard to make sufficient money subsequently.

In Zeng Tianshan’s (2016) article, measuring the effect of “Poverty Alleviation through Education Policy” should be problem-oriented. The poverty alleviation program of Dianxi District helps scholars to find the crux, which are four issues: low quality of education, little human capital, unbalanced educational public service, and lack of opportunities for further studies. He suggested innovative mechanisms to assure the effectiveness of poverty alleviation through education. For instance, identifying the real poverty person to enhance the counterpart assistance to build a sustainable development mechanism. Li Xingzhou (2017) considered that research on the topic should shift to a new perspective of modern social governance and sustainable development, referring to why we need poverty alleviation through education and what achievement we want to make. In fact, poverty alleviation through education reflects a series of principles, like differential justice, fair entry point, equality of rights, fair process, equal access, and fair outcome. So as to realize the vision, China ought to guarantee the educational rights, better conditions, and the education income of poverty areas and poverty people.

Wu Ni and Wang Xuenan (2017) introduced an overview perspective of the policies in poverty alleviation through education. During decades of development, poverty alleviation policy in education has gradually become a complete, scientific, and systematic system which contained five developing characteristics: the people-oriented value orientation is more clearly; the quality of people’s livelihood gets much progressed; poverty alleviation methods are more accurate; cooperation of social forces is more extensive; the concept of the community of shared future for mankind is taken more seriously.

With the advancement of China’s poverty reduction policy, more problems are emerging, some local governments in poverty areas urged to make political achievements that lead to ignoring the law of education. Dai Ruihua and Yu Xuan (2017) listed several wrong behaviors including misappropriating education funds, wasting public education resources, and simply regarding it as a political task, these formalistic actions greatly weaken the effect of education in poverty reduction. Apart from them, Zhang Qi and Shi Zhile (2017) thought poverty people are prone to passively receive assistance rather than initiatively familiar with local policies and regulations. For those parents and students in poverty areas believe education is useless, they do not have any motivation to get rid of poverty. Then, the more essential question is: how to solve these problems? Dai Ruihua and Zhang Qi reached a consensus which the government ought to change the poverty alleviation system, adhere to people-oriented to make each poverty student share a high-quality education as the same as those in the country. Moreover, emphasizing the sense of responsibility of multiple governance entities to provide a guarantee for practice in education poverty alleviation.

4.4. Research tendency: Analysis of hotspots evolution
The purpose of this part is to show the dynamic of poverty alleviation through education from a historical perspective, which is closely related to anti-poverty strategies from China’s government. With the timeline analysis of Citespace5.0, we gain a more comprehensive and profound understanding of research hotspots in the field from 1999 to 2018. Research hotspots refer to the topics studied by a group of literature that has large quantities and closely intrinsic links in a period. We choose “Keyword” for node type, “2” for time slice, then repeated adjustments, the threshold is set to (2, 2, 10) (2, 2, 20) (2, 2, 0). After generating Visualization in Time Zone, the time tendency appeared (Figure Figure 5). The bigger the node is, the frequency of the keyword is more. The area where the node is located means the keyword firstly appeared in the period. Keywords present the trend of Chinese scholars’ research hotspots with the time
changing. The popular keywords include “poverty alleviation through education” “targeted poverty alleviation” “higher education” “poverty-stricken areas” “targeted poverty alleviation through education” “rural education” “education” “poverty” “poverty-stricken college students” “educational equity” and so on.

Now that we know the hotspot trend of research, if we combine with the keyword that bursts in different periods, then the timeline will be more prominent. In that case, calculating the citation burst of “poverty alleviation through education” research is in need. The software automatically lists the keywords that burst the strongest (Figure 6). For example, the keyword “poverty-stricken areas”, was burst from 2001 to 2005, showed in a few continuous red lines, or we can easily see the period of Begin-End. It means papers published around poverty-stricken areas were quite a lot. But after 2006, other bursting keywords were replaced the previous, like “educational equity” “targeted poverty alleviation”. With the change in policies and development of information technology, the topic shifted to “targeted poverty alleviation through education” “educational informatization” since 2017. Associating the time zone with bursting keywords, the timeline is divided into 3 stages to reflect the historical development of poverty alleviation through education.

4.4.1. Preliminary period (1999-2003)
This stage is mainly to study the relationship between education and poverty, to reveal problems encountered in poverty-stricken areas, especially the western areas, and to show the serious situation that college students face when they need to finish their academic tasks. There is no
doubt that education has economic value since Schultz (1961) proposed the concept of human capital. There is a negative correlation between education and poverty. In a country or a region, when people have a higher education level, they provide higher labor efficiency to promote the economy. Citizens can obtain more job opportunities and high incomes, and the probability and risk of unemployment and poverty will become lower (Shen Xiaomei, 2002). Although education plays a key role in regional economic development, the education situation in poverty-stricken areas is grim. Citizens in Northwest China are seriously lagging in educational thoughts and concepts, hardly realize the significance of being educated. With low productivity and limited funds, local governments ignore the economic benefit that profound education can indirectly bring. As the scale and conditions, structure and level, quantity and quality of education are imbalanced, not only directly affect the effectiveness of education but also leads to a vicious circle of education and economy, which the backward economy lacks revenue, insufficient revenue brings in insufficient education that people could not get high-quality education to master a skill to create a better life. That is why the low quality of education usually happens in poverty-stricken areas. (Bailai, 1999).

There is an alarm that the existence of economic development serves human beings: the economy is the means, and human development is the goal. The essence of education is to develop people and improve their life quality (Xuemin & Shiya, 2003). They demonstrate that poverty-stricken areas in the west have their characteristics, which are abundant in natural resources and humanities, but scarce in the economy, technology, and education. Local governments in west areas often sacrifice the ecology for the sake of economic development to make the ecological environment fragile. As a result, the government could not take good advantage of the plentiful natural resources and humanities, fail to achieve sustained development to support the local economy, technology, and education. So, how to solve the problem? What they suggest is the natural ecology and human ecology in the west form a benign interactive system, strengthen green education, and support westerners to take initiatives to abandon the short-term behaviors including disregarding the overall development of the country. Instead, wrong actions should be replaced by long-term vision including protecting the natural ecology, consolidating national culture, and striving for the harmonious, coordinated, and sustainable development of people, nature, and society in the western region.

The cost issues of college students from poverty-stricken areas are also discussed at this time. The fee system of China's higher education, as a public product, was born in 1989 to be beneficial for alleviating the contradiction of insufficient investment in higher education and the dilemma of national financial difficulties, providing students with more chances to get into a higher education level. The fact that cannot be ignored is the fee indeed become a heavy burden for students who are from low-income families. A large sum of poverty students cannot afford to pay for college fees (Li Congsong, 2002). Based on that situation, MengXin (2003) had a questionnaire survey of 210 university students to evaluate the national funding system such as scholarships, tuition reductions, student loans, and work-study assistance. In order to make as many poverty students as possible to attend a college, a “funding package” is in demand. The funding package is a mixture of all kinds of funding forms, like student loans, work-study programs, and others. The sum of fund student can obtain is in line with the poverty level. Through this combination, the poorest student can obtain the most fund, students are not that poor can also get some monetary support from the “funding package”.

4.4.2. Exploration period (2004-2012)
From 2004 to 2012, scholars deepened the dynamic analysis of the relationship between education and poverty, used quantitative research methods to prove it. Meanwhile, more emphasis was placed on the importance of education equity, and balanced development of education in poverty-stricken areas. The targets of poverty alleviation through education have also expanded, not only focusing on material assistance but also deeper content, such as the psychological problems of the poverty-stricken college student. According to the estimation method of the two-stage Probit
Model, research on the rural household survey data of the Shanghai Rural Social and Economic Investigation Team from 2000 to 2004 showed the education level of farmers had a significant impact on their poverty status, which implied a higher education level can reduce the probability of farmers falling into poverty. Besides, farmers’ education level was endogenous, and poor families would reduce their human capital investment in future generations due to income restriction (Liu Xiuyan et al., 2007). In other research, Xuan and Linzhi (2009) selected three important data including the number of persons who received compulsory education in every 100 rural labors, the number of persons who are illiterate or semi-illiterate in every 100 rural labors, and the number of persons who have a high school education level or above, to reflect the overall situation of rural human resources completing the education process and transforming into labor productivity. By using Grey Theory, they showed the results that rural education has a positive impact on the improvement of the economic status of rural households, and was of great significance to alleviating poverty, especially absolute poverty.

Because of the low quality of education in poverty-stricken areas, Jin Donghai and Donghai and Yusheng (2009) were aware of unbalanced educational development in different regions directly affect educational equity. The balanced development of compulsory education should be divided into four levels and goals from low to high are in accordance with the country’s economic and education level: to provide more people with more educational opportunities; to provide educated people relatively fair educational resources; to provide good conditions for students; to provide fair and high-quality education for all students. Based on the minimum standard goals, the country and government have the responsibility to ensure that poverty-stricken children who cannot afford to go to school enter schools and enjoy relatively fair studying resources to successfully finish school in the western rural and ethnic areas. The psychological problems of poverty-stricken college students have been discussed from different aspects. Poverty can easily lead to “abnormal psychology” or “unhealthy psychology”, which makes a person go through a difficult psychological process, and behaves harmfully to himself and others. Inferiority, depression, sensitivity, anxiety are four types of common psychological perplexities (Kong Xianfu, 2010). Positive Mental Health Education (PMHE) is an effective way to help poverty-stricken college student get rid of unhealthy emotions, to adapt to school life. Huang Gangwei (2011) utilized Maslow’s hierarchy of needs to analyze the psychological situation of 4510 college students with some are from poverty families, others are not. Compared with students who are not poor, poverty-stricken college students face many difficulties in basic needs. They must do the spare-time job to make more money to sustain school life, sometimes could not get enough respect due to poverty, or could not dare to hold chances that they want. These negative aspects all damage students’ belief in realizing personal value. Considering this situation, policies need to improve the material living environment of college students in poverty-stricken areas. Colleges or universities could provide more campus cultural activities for them to communicate with the outside world, then provide correct guidance on the outlook on the world, life, and values.

4.4.3. Innovation period (2013-2018)
At this stage, China has launched a new and huge project that is called “The Targeted Poverty Alleviation Policy”, in which the clear objective is to eradicate extreme poverty in Chinese rural areas by 2020. As the study develops in-depth, poverty alleviation through education is put on a more and more outstanding position, which is the foundation of sustainable development. A large number of scholars have studied how education can effectively alleviate poverty from the perspective of theory and practice, and how to utilize education informatization to promote education quality in poverty-stricken areas. This is more accurate than in previous studies.

Wang Jiayi et al. (2016) demonstrates education plays a basic, leading, and continuous role in targeted poverty alleviation, which is to promote the ability of the poor to break the circle of the intergenerational transmission of poverty. It is necessary to be concerned about the most urgent, critical problems of the poor for receiving various types of education. Governments focus on designing at the top level and overall planning of targeted poverty alleviation through education, intending to
better allocate all the resources required and ensuring the efficient realization of its goals, building a comprehensive system of preschool education, compulsory education, general high school education, vocational education, higher education, ethnic education, faculty, student funding, and examination and enrollment. In that case, implementing a “point-to-face” package of support plans to ensure that policies of targeted poverty alleviation through education benefit the majority of the poor. Especially for improving the level of education development in poverty-stricken areas.

Experts are aware of the restrictions of education function in poverty alleviation. The diversity and complexity of the poverty problem determine that poverty alleviation through education cannot rely solely on pedagogy, but on the basis of a radical rethinking of poverty. Placing poverty alleviation through education in economics, sociology, pedagogy, anthropology, and geography is a necessity to have insight into eliminating poverty through education from a multidisciplinary perspective (Liping & Xinxin, 2018). On the one hand, differences in connotation caused by different theoretical foundations give rise to the varied characteristics of the poverty alleviation mechanism of multidisciplinary education. On the other hand, the various disciplines are not isolated, as opposed to each other. Therefore, poverty alleviation through education under the multi-disciplinary framework shows the characteristics of integration and consistency, which build up a good basis for eliminating poverty.

Targeted poverty alleviation through education is a result of the specific historical conditions in China, which emphasizes the refined operation of the object, goal, project, process, evaluation, etc. As the nation is vigorously putting forward the information construction, information technology has gradually become an effective means of implementing targeted poverty alleviation to improve efficiency (Ren Youqun et al., 2017). Taking full advantage of information-based education during the process of targeted poverty alleviation, governments and schools accurately obtain information about how students’ life improved and their academic performance through the database. In such a syndrome database environment, monitoring the dynamic changes of students who are living in poor conditions is no longer cumbersome, exemption from manual registration, manual statistics, and reporting procedures. Moreover, collecting big data is an effective way to reversely trace and dynamically manage the objects with unknown conditions, unclear whereabouts, and poor results. For the sake of implementing poverty alleviation work, gathering big data also contribute to the entry and exit mechanism, as well as the accountability system.

5. Discussion and conclusions

With the method of bibliometrics and knowledge mapping, a statistical analysis by Citespace5.0 is performed on 363 papers, published in the CSSCI database from 1999 to 2018. The research process is closely related to social development and policy dynamics, although the notion of poverty alleviation through education has been forming substantially in policy, there are not many researchers pay close attention to education and poverty until the policy “The Targeted Poverty Alleviation” was launched in 2013. As for the authors and institutes, their cooperation is rare, mostly originating from the educational and social field. Among the literature of the turning points, Xie Junjun summarized the common research content in the first place, then, Zhou Wei, Liu Junhao and other scholars studied various aspects of poverty alleviation through education. The research hotspots in the field have gone through three stages including the preliminary period (1999–2003), exploration period (2004–2012) and innovation period (2013–2018).

Among others, the results indicate that horizontal and vertical cooperation mechanisms are in need to deepen the connotation of poverty alleviation through education, particularly inter-disciplinary cooperation. Combined with its characteristics, the theory probably will contribute to be more effectively for policy design to eliminate poverty. In addition, the intergenerational transmission should be viewed with some concern, under the new economic condition, the causes of poverty become more and more multidimensional, subjective poverty and information poverty will be included in the study area. Besides, improving capacity of sustainable development for the
poor is also very important to avoid themselves getting involved into the poverty trap. We believe the results will make a right way in the following poverty alleviation programs and projects.

6. Implication and recommendations

These findings imply that the government is extremely crucial to improvement of impoverished people and areas. Assuming that China did not take effective policies and measurements according to the changing social institution, students from economically disadvantaged families would never have the chance to get a higher education, then their children would probably fall into the same old trap again. Undoubtedly, China has absolute power to eliminate poverty through education at various government levels, but such top-down campaign lacks pointed and individual perspective to care about students’ deeper issues not just expenditure on education. Therefore, China should transform its’ government roles to integrate resources in all respects so as to construct a multi-body system. The Third Sector, and universities could be empowered to develop potentials to the poverty eradication through education. Generally, The Third Sector as a vital supplement to lighten the burden on the local government, as for universities and colleges, their basic research and applied research help government to get better understanding of poverty, resolving the problems of spiritual poverty and information poverty increasingly. Besides, supportive policies aim at increasing enrollment rates, enrollment quotas with high efficiency cannot meet demands of high-quality education. So that education equality should be the urgent issue needed to be solved in urban and rural districts.

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