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The focus of research on private supplementary tutoring in China in the past two decades

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***Keywords*— private supplementary tutoring, visual analysis, hot spots**

***Abstract*—** *In recent years, private supplementary tutoring has developed rapidly, and its market size has expanded rapidly, which has attracted widespread attention from researchers in the fields of politics, economy, and education at home and abroad. This study uses the knowledge graph system provided by CiteSpace software to sort out 149 related literature on private supplementary tutoring research in China from 2000 to 2021 included in the Web of Science. The study found that "private tutoring theory", "private tutoring and educational equity", "private tutoring institutions", "private tutoring policy", "private tutoring and family capital", and "private tutoring and public education" is a research hotspot in this field in China in the past two decades. Private supplementary tutoring research in China started late, and the research paradigm is different from that of international research, and the research methods used are relatively simple. On the theoretical basis, the theoretical research on private supplementary tutoring is relatively weak and has not yet formed a complete system.*

I. INTRODUCTION

Private supplementary tutoring refers to the training activities that students participate in outside of mainstream public or private school education. Because the tutoring content is basically like the one included in the mainstream school curriculum, it is called "shadow education"(Bray, 1999, 2009; Buchmann et al., 2010; Stevenson & Baker, 1992). "Shadow education" has built its rationale and approach to supplement and imitate formal mainstream education in schools. When the curriculum of mainstream education changes, the "shadow curriculum" also changes with it, just like the shadow projected by mainstream school education, which changes with the change of mainstream education (Stevenson & Baker, 1992).

Private supplementary tutoring was very common in Asia, Africa, and Latin America. In East Asia, such as China, Korea, and Japan, the proportion of students receiving private tutoring is very high (Bray, 2020; Bray & Lykins, 2012; Kim & Jung, 2019; Kim & Lee, 2010; Liu, 2012; Manzon & Areepattamannil, 2014). There has been a marked increase in private tutoring in African countries (Antonowicz et al., 2010; Buchmann, 2002; Napporn & Baba-Moussa, 2013). And this private tutoring phenomenon has significantly expanded to North and South America (Davies & Aurini, 2006; Diskin, 2010; Sunderman, 2007; Ventura & Gomes, 2013). And this phenomenon of tutoring also occurs in parts of Eastern and Western Europe (Bray, 2011; Lamprianou & Afantiti Lamprianou, 2013; Silova et al., 2006; Silova, 2010). In recent years, private supplementary tutoring has expanded to northern Europe (Bray, 2021; Çalişkan & Callon, 2010; Jokila et al., 2021; Zhang, 2021).

Private supplementary tutoring is a familiar expression in our daily life. In recent decades, although private supplementary tutoring has different forms and functions in different social environments, private supplementary tutoring has rapidly developed into a global phenomenon (Aurini & Davies, 2004; Bray, 2009; Lee et al. 2009; Mori and Baker 2010).

In China, the academic competition and the high-density student population are so widespread that students and parents are increasingly looking for private (supplementary) classes in the primary and secondary phases. Private supplementary tutoring has expanded and intensified in

China. Based on the above background, this study summarizes the main research contents and research progress by sorting out the academic literature related to private supplementary tutoring in China published in the last 20 years in the Web of Science database and analyzes the overall development trend of private supplementary tutoring research in China in the past two decades.

II. THEORETICAL CONTEXTUALIZATION

Concept definition

Stevenson and Mark define shadow education as a series of educational activities that take place outside of regular school education and aim to improve students' academic performance (Stevenson & Mark, 1992: 1639).

Mark Bray extended the concept of shadow education to educational research and redefined shadow education by considering three aspects. First, the complementarity of "shadow education", the subjects taught by shadow education are consistent with the school subjects, as a supplement to the school rather than an extra creation; Second, the private nature of "shadow education". Shadow education is not supported by public expenses. The tutoring provided is for the purpose of profit by individuals or enterprises; third, the academic nature of "shadow education". The subjects that shadow education focuses on are the academic courses of the school, mainly including mathematics, languages, and other subjects that are evaluated through examinations. These subjects bring greater learning pressure to students, which is different from non-core subjects such as music, art, and sports. (Bray, 1999).

The discussion of private tutoring research should start with the definition of the concept. Many researchers either explicitly or implicitly define private supplementary tutoring from different angles. The definition involves the understanding of the three words, private, supplementary, and tutoring. Mark Bray focused on the extracurricular tutoring activities of primary and middle school students, and clearly defined the three characteristics of extracurricular tutoring (Bray, 1999: 20). He continued the definition and use of these three features in subsequent series of articles. (Bray, 1999) (Bray, 2003) (Bray, 2009) (Bray& Lykins, 2012) (Bray & Kwo, 2014).

China's research on Private tuition started relatively late. Most Chinese scholars have made different definitions of Private tuition based on Mark's definition and their respective research priorities. Most Chinese scholars emphasize the following five aspects in the definition of concepts: (1) Supplementary: school supplementary education; (2) Paid: the recipient needs to pay the provider; (3) Private: extra-curricular tutoring is an individual choice of the student or family; (4) Object: Students receiving formal education; (5) Content: Academic courses (Lei, 2008; Peng, 2007; Zhang & Mark, 2017).

Whether it is "shadow education", " Private supplementary tutoring ", "extracurricular tutoring", etc., they all involve the following meanings: One is the space where shadow education exists – outside of school education or mainstream education or formal education; The second is about the content of shadow education – mostly like the school curriculum. To complete or help complete a certain assessment is the goal; the third is about the target of shadow education-students in school as the main body. In general, Private tuition is defined as the paid academic tutoring that students receive outside of school, mainly in academic courses, aimed at improving students' academic performance.

III. RESEARCH METHODS

(1) Research design

This research systematically collects relevant literature on Chinese private supplementary tutoring research on the Web of Science, organizes it into a literature collection, and analyzes it based on the visualization software CiteSpace. Statistical literature focuses on high-frequency keywords and high-cited literature and sorts out research results in the field of private tutoring in the past two decades.

CiteSpace is a freely available Java application for visualizing and analyzing trends and patterns in scientific literature. It is designed as a tool for progressive knowledge domain visualization. It focuses on finding critical points in the development of a field or a domain, especially intellectual turning points and pivotal points (Chen, 2004). The main functions are software for measuring and analyzing scientific literature data, and identifying and displaying new trends in scientific development, which is accurate and efficient in analyzing and visualizing co-citation networks.

(2) Data sources and selection principles

This research uses the documents included in the core collection of Web of Science as the retrieval source and uses the retrieval formula of “Theme = shadow education, China or theme = private tutoring, China or theme = supplementary education, China”, the time range is set from 2000 to 2021, and manually screened and eliminated the literature that did not match the theme, and finally obtained 185 valid works of literature with high relevance as the data source of this study. CiteSpace software was used to visualize the current situation and development

trend of 149 (after CiteSpace software automatically filters) works of literature.

IV. RESEARCH RESULTS AND ANALYSIS

1. Keyword co-occurrence and analysis

As an important part of the article, keywords usually represent the theme of the thesis. Through the co-occurrence analysis of keywords, it can show which keywords co-occur more frequently, and can intuitively show the research hotspots in the field of shadow private tutoring. As shown in Figure 1, from the analysis, the number of nodes N = 230, the number of connections E = 809, and the density = 0. 0307's visualization map. Each node in the graph represents a keyword, the number of co-occurrences of two different keywords is positively correlated with the distance between nodes, and the closer the distance is, the more co-occurrence of keywords.

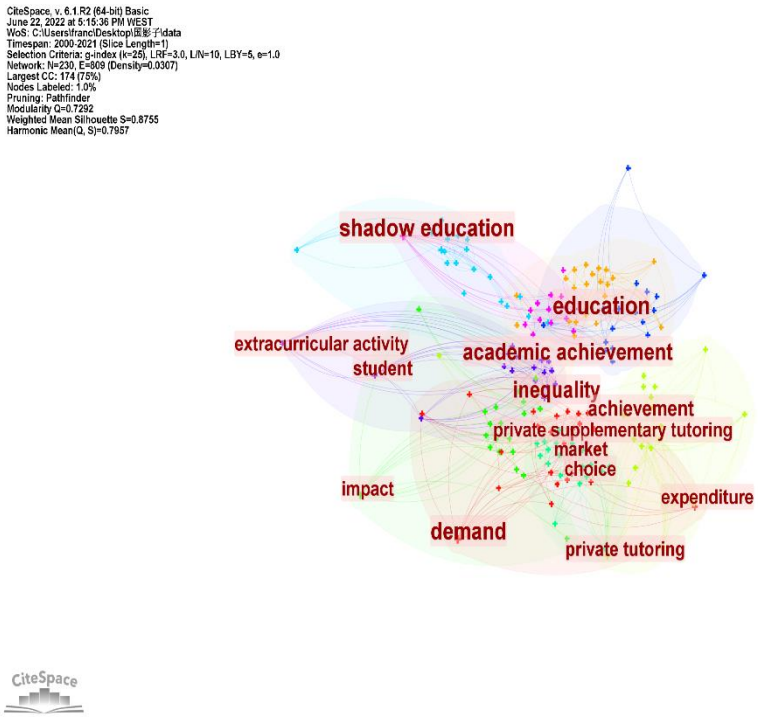

Fig.1. Keyword co-occurrence view of private tutoring research from 2000 to 2021

Figure 2,3 counts the top nine high-frequency keywords and high-centrality keywords.

Rank order	High-frequency keywords	Frequency	Centrality
1	shadow education	25	0.799
2	educational equity	22	0.834
3	private tutoring	20	0.953
4	public education spending	20	0.839
5	social mobility	19	0.858
6	environmental ideology education	19	0.868
7	urban China	17	0.928
8	academic achievement	17	0.915
9	supplementary education	15	0.936

Fig.2, High-frequency keywords

Rank order	High-centrality keywords	Centrality	Frequency
1	private tutoring	0.953	20
2	supplementary education	0.936	15
3	urban China	0.928	17
4	academic achievement	0.915	17
5	environmental ideology education	0.868	19
6	social mobility	0.858	19
7	public education spending	0.839	20
8	educational equity	0.834	22
9	shadow education	0.799	25

Fig.3, High-centrality keywords

From Figures 1, 2, and 3, it is found that shadow education appears 25 times as a keyword, ranking first. The top three high-frequency keywords are shadow education (25 times), educational equity (22 times), and private tutoring (20 times). The top three high-centrality keywords are private tutoring (20 times, 0.953), supplementary education (15 times, 0.936), and urban China (17 times, 0.928). The nine words shown in figures 2 and 3 are all high-frequency keywords and high-centrality keywords.

From the above data analysis, the current research on private supplementary tutoring in China focuses on the following major directions: (1) conceptual and empirical research on shadow education or private supplementary tutoring; (2) research on private supplementary tutoring and academic performance; (3) research on private supplementary tutoring and family capital; (4) research on private supplementary tutoring and educational equity.

2. Keyword Clustering and analysis

Based on the keyword co-occurrence map, the log-likelihood ratio (LLR) is used to cluster the keywords, as shown in Figure 4 below. #0 to #8 in the figure represent the sequence numbers of the clusters, and the smaller the sequence number value, the larger the cluster size. The evaluation indicators of clustering attempts in this part show that: the clustering module Q = 0.7292 (Q > 0.3 indicates that the partition structure is significant), and the average clustering threshold S = 0.8755 (S > 0.5 indicates that the clustering is reasonable, S > 0.7 means the clustering is efficient and convincing). The harmonic mean is 0.7957, the above data show that the clustering effect of Figure 4 is good.

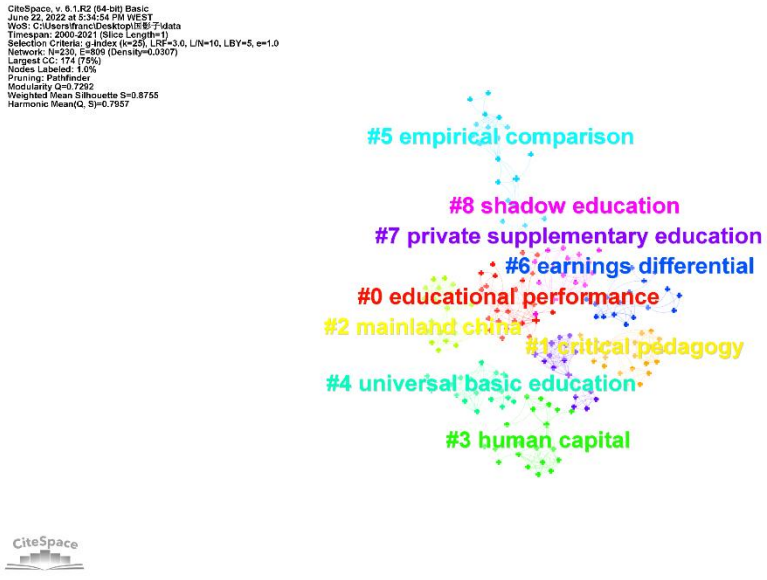

Fig.4. Keyword clustering view of private tutoring research from 2000 to 2021

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From Figure 4, the high-frequency keywords of private supplementary tutoring research in China in the past 20 years have been clustered into 9 categories, the order is #0 educational performance, #1 critical pedagogy, #2 mainland China, #3 human capital, #4 universal basic education, #5 empirical comparison, #6 earnings differential, #7 private supplementary education, #8 shadow education.

#0 educational performance mainly includes the following keywords: shadow education; private supplementary tutoring; international schools; private tutoring; demand; competition; school choice, etc. The scores of students who participate in extracurricular tutoring are significantly higher than those of students who do not participate in extracurricular tutoring (Kim, 2015) (Fang, 2014), However, the effect of one-on-one tutoring is not as good as that of extracurricular tutoring classes (Byun, 2012) (Li, 2017). Different types of students have different choices for private supplementary tutoring. Students' gender, intelligence, grade, educational desire, etc., all indicate their choices (Š astný, 2016) (Hawrot, 2018). This shows the impact of private supplementary tutoring at the student level.

#1 critical pedagogy mainly includes the following keywords: critical pedagogy; educational equity; education policy; Chinese education; private tutoring effect; educational purposes; rural education; education quality; school dropout, etc. In larger cities, extracurricular tutoring is a necessity rather than a luxury item, and “training the best” is the dominant one (Chen, 2015). Key schools and students with better academic performance are more likely to participate in private supplementary tutoring (Fang, 2014) (Xue, 2015). This shows that current Chinese scholars are paying more and more attention to the impact of private supplementary tutoring on educational equity from the perspective of social issues.

#2 mainland China mainly includes the following keywords: private tutoring; public education spending; household education spending; urban China; mainland China; student outcomes; educational benefits, etc. Chinese scholars' research on private supplementary tutoring is becoming more and more detailed and comprehensive, and the theoretical research on private supplementary tutoring at the beginning has gradually changed to empirical research.

#3 human capital mainly includes the following keywords: private tutoring; achievement effect; human capital; family expenditure; academic performance, etc. Many studies have shown that at the family level, the probability of receiving family counseling is positively correlated with family monthly income, and research on the cost of private supplementary tutoring also shows that only families with better financial conditions could obtain higher-quality private tutoring services.

#4 universal basic education mainly includes the following keywords: social mobility; migrant education; counter-school culture; institutional discrimination, etc. Due to the fierce competition in the entrance examination for compulsory education in China, private tutoring is a common social phenomenon. Chinese scholars' research on the participation of primary and secondary school students in compulsory education in private tutoring is mostly empirical research, and most scholars focus on the impact of this phenomenon on the academic performance of primary and secondary school students.

#5 empirical comparison mainly includes the following keywords: environmental ideology education; state-owned enterprises; government agencies, etc. In the field of education governance, due to the different situations of private tutoring in different countries, the attitude of the government towards private tutoring and the policies issued are also different. Therefore, Chinese scholars have different priorities when studying relevant policies of different countries.

#6 earnings differential mainly includes the following keywords: urban China; education; gender; economy, etc. In urban areas, students participate the most in private supplementary tutoring. The pressure of entering a higher school has become the main reason for students to participate in tutoring (Ha & Park, 2017). It is not difficult to see that due to various academic reasons such as pressure to enter a higher school, the more likely children from families in the "city center" are to participate in shadow education (Tong, 2017). At present, most Chinese scholars combine the theory of family capital to study the phenomenon of private tutoring.

#7 private supplementary education mainly includes the following keywords: academic achievement; cognitive ability; socioeconomic status; private supplementary education; human development; sociocultural framework; the education system, etc. Parents and students demand

private supplementary tutoring and the influence of Confucian culture. It is also a kind of corporate activity aimed at profit. The background of China's market economy and society facilitates the generation and marketization of private supplementary tutoring.

#8 shadow education mainly includes the following keywords: shadow education; supplementary education; organizing activity; private tutoring; education policy; mainstream teachers; power relations, etc. This shows that the research on off-campus training institutions, related policies, and the governance of private tutoring is the current research focus in China. With the introduction of relevant national policies, the governance of off-campus training institutions will be one of the research hotspots of private supplementary tutoring in the future.

In terms of research hotspots and trends, through keyword co-occurrence and cluster analysis, it is found that "private tutoring theory", "private tutoring and educational equity", "private tutoring institutions", "private tutoring policy", "private tutoring and family capital", "private tutoring and public education" is a research hotspot in this field in China in the past two decades.

At present, research on private tutoring in China is mostly concentrated in the fields of education, economy, and society, and other disciplines have less penetration in the field of private tutoring research. It is suggested that future research may incorporate a research perspective of interdisciplinary collaboration.

V. CONCLUSION

China's private supplementary tutoring research started relatively late, and its research paradigm is different from international research. From the perspective of research paradigms, empirical research is the focus of the world. Although China also has some empirical research, the overall situation is mostly based on phenomenon analysis.

In terms of research methods, most of the research in China adopts one of the qualitative or quantitative methods, mainly quantitative research, including questionnaire surveys, interview surveys, case analysis, and comparative research. Few studies have used a combination of qualitative and quantitative methods. Therefore, future research on private supplementary tutoring can combine multiple research methods.

On a theoretical basis, the theoretical research on private tutoring in China is relatively modest. Although there are more and more studies on private tutoring, a complete system has not been formed. Most of the research on private tutoring in China combines family capital theory, or other common theoretical perspectives including cultural capital, human capital, etc. In general, building a diverse theoretical network, connecting theoretical and empirical research, strengthening qualitative research, and generating theories are the directions that future Chinese private tutoring research needs to invest.

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