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Article

A bibliometric analysis of Chinese higher education policy in the past two decades: Sustainable development and internationalization

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Abstract: This study aims to explore the research on Chinese higher education policy from 2005 to 2024 through a bibliometric analysis. It is revealed that a continuous growth trend and sustained academic interest in this field. Mainland China leads in publication quantity, showcasing the active involvement of Chinese scholars in higher education policy research. Institutions like Peking University, the University of Hong Kong, and Beijing Normal University play significant roles in this research domain. The focus of research has shifted from student attitudes to international students, teachers, innovation models, changing demands, and urban education development, reflecting a growing emphasis on sustainability and internationalization. The study highlights the positive development trajectory of Chinese higher education policy research, with expanding research focuses and deepening concerns for sustainability and internationalization.

Keywords: higher education; bibliometric analysis; sustainability; internationalization; policy

1. Introduction

In the past 20 years, China has undergone significant changes in its higher education sector. Chinese universities not only grow in size, but numerous new institutions and universities have appeared (Bai, 2006). These changes are closely tied to policies, such as those concerning sustainable development. Higher education plays a crucial role in sustainable development, especially in the context of rapid economic growth, urbanization, environmental degradation, climate change, and resource depletion brought about by the Industrial Revolution (McNeill and Engelke, 2016). Sustainable development has emerged as a vital development model that integrates environmental, social, and economic considerations (WCED, 1987). Universities and college students are seen as key drivers of future sustainable development, with education being identified as the most effective means to promote and implement sustainable development principles (Xiang-chao, 2019). After the United Nations Conference on Environment and Development, the Chinese government took the lead in formulating the "China Agenda 21—China's Agenda for the 21st Century: Population, Environment, and Development White Paper" (State Council of the People's Republic of China, 1994). This document served as a guiding framework for China's national economic and social development and marked the beginning of China's sustainable development journey. In order to comprehensively promote the implementation of sustainable development strategies and clearly define the goals, principles, key areas, and safeguard measures for sustainable development in China in

the early 21st century, the "Action Plan for Sustainable Development in China in the Early 21st Century" was formulated (State Council of the People's Republic of China, 2003). Based on previous achievements and experiences, this plan was developed to address the new circumstances and requirements of sustainable development, ensuring the smooth realization of China's third-step strategic goals for economic and social development. The plan highlights the Chinese government's emphasis on sustainable development in higher education, such as the inclusion of sustainable development content in higher education textbooks and the establishment of sustainable development demonstration parks in some higher education institutions. Additionally, the plan reflects the government's commitment to internationalization, emphasizing the need to strengthen international cooperation, create a favorable international environment for sustainable development, and promote exchanges of experiences, personnel mobility, and international cooperation projects. These policy measures underscore the active role of the Chinese government in promoting sustainable development and internationalization in higher education. By formulating action plans and related policy documents, the Chinese government is dedicated to enhancing the quality of higher education, fostering sustainable development principles, and fostering a global perspective in the pursuit of sustainable development.

As China actively engages in internationalizing higher education and aims to establish a high-quality brand for international student education, discussions revolve around enrollment, employment, institutional levels, and development (Zhang and Liao, 2021).The Chinese government demonstrates a sustained commitment to education policy, aiming to enhance educational standards, promote social equity, and cultivate globally competitive talents through continuous reforms and international cooperation (Hu et al., 2024; Li and Xue, 2022).

In the realm of Chinese higher education policy research, scholars have extensively studied various aspects, including the need for more specific and actionable policies to effectively implement special education (Zhang and Deng, 2023). Academic functions in China are primarily realized through the Chinese (Zhang et al., 2023). Despite the growing body of research on Chinese higher education policy, there has been a lack of studies examining the overall trends in these policy research publications. By conducting an investigation into the themes of these research studies, this study aims to explore the evolution of research topics in Chinese higher education policy and examine their alignment with official policy documents. Furthermore, this analysis seeks to assess whether the current state of Chinese higher education policy aligns with the goals of sustainable development and demonstrates positive trends in international integration. By filling this research gap, this study aims to provide valuable insights into the current landscape of Chinese higher education policy and its alignment with sustainability objectives and internationalization trends.

This study aims to explore the evolution and future trends of Chinese higher education policy research in sustainable development and globalization. Through the review of literature and analysis of Chinese higher education policy over the past two decades, this study aims to contribute to a deeper understanding of the landscape and trends in this field (Garfield, 1955). By employing bibliometrics analysis, the research can quantitatively analyze the contributions of authors, journals, regions, and

institutions in the field of Chinese higher education policy, providing valuable insights into the most significant contributions in this domain (Gil and Ulitsky, 2020).

2. Literature review

2.1. Sustainability of higher education

The Industrial Revolution has brought significant economic growth to the world, but it has also led to rapid population growth, accelerated urbanization, and subsequently, significant environmental degradation, climate change, and resource depletion (McNeill and Engelke, 2016). To address these challenges, sustainable development has emerged as a development model that integrates environmental, social, and economic considerations (WCED, 1987). University students are the backbone of future environmental, social, and economic sustainability (Xiang, 2019), and education is the most effective pathway to shaping and implementing sustainable development principles (Nasibulina, 2015). Therefore, maintaining the role of education in promoting a sustainable society will pave the way for a brighter and greener future for nations and their citizens (Yelubayeva et al., 2023). It is necessary to systematically integrate higher education into sustainable development (Filho, 2011).

To achieve sustainable higher education, scholars have proposed strengthening technical education (Leal Filho et al., 2009), mathematical education (Mawarti and Nurlaelah, 2020), environmental education (Karpan et al., 2020), as well as adopting a comprehensive approach such as STEM education that encompasses these perspectives (Buturlina et al., 2021). It is also important to avoid disciplinary bias (Katayama et al., 2018; Yu et al., 2022). Additionally, it is crucial to develop and publish instructional materials that are more suitable for sustainable higher education and provide training for teachers to implement these contents in the classroom (Ge et al., 2023). Speaking of teachers, attention should also be given to the systemic characteristics of teacher development (Ma et al., 2022). Lastly, at the institutional level, it is important to prioritize the enhancement of financial resources in higher education institutions (Aleixo et al., 2018). Furthermore, research has shown a significant interrelationship between higher education, globalization, and sustainable development (Sart, 2022).

2.2. Globalization of Chinese higher education

Globalization encompasses transnational political, economic, and cultural ideologies and values. Universities must be well-prepared to meet the needs of students not only in academic fields, but also in social and cultural aspects (Ferencz et al., 2020). Leading universities in advanced countries are actively integrating into international education and interactions (Kretschmann et al., 2020). By establishing strong international partnerships with universities worldwide, higher educational institutions can provide students with more affordable learning opportunities which can satisify their academic needs (Strielkowski et al., 2021). As a large economic power, China should set an example in globalization (Wen, 2021). For researchers in higher education, it is necessary to step out of their comfort zones and research in a

more globalized manner (Huang et al., 2024; Tight, 2021; Wang et al., 2024). Similarly, for foreign professionals, such as those from Europe, staying in China is an important step to enhance their competitiveness in the global academic market (Braun Střelcová et al., 2023). Amid the background of globalization, China should focus on the development of world-class universities and the pay more attention to the evaluation of higher education quality, especially innovative educational models and the expansion of high-quality educational resources (Li and Xue, 2022). Yang and You (2018) explored the impact of world-class universities (WCU) on teachers' research productivity from the perspective of globalization and national demand. Overall, the research supports the globalizalized dimension of the WCU project in China.

2.3. Research on Chinese higher education policies

The Chinese government has always been committed to improving the accessibility of education. Among them, the "Education Revitalization Action Plan for 2003–2007" is a key policy that was approved on 13 January 1999. It was formulated by the Ministry of Education. However, it is pointed out that the implementation of this policy unexpectedly exacerbated educational inequality, resulting in students from politically and economically central regions having more opportunities to receive higher education (Dong et al., 2022; Xu et al., 2022). Despite this, the Chinese government has not stopped its efforts. At the Third Plenary Session of the 18th Central Committee of the Communist Party of China in November 2013, a decision was made on several major issues concerning the comprehensive deepening of reforms, including reforms in the education.

China has become more confident in achieving a balance between quantity, structure, quality, and efficiency, and is committed to building "Study in China" as an international brand. China's the Belt and Road Initiative defines student exchanges as one of the strategies to strengthen greater connectivity and enhance cooperation between countries. Scholars have also conducted extensive research on China's higher education policies. Some argued that future policies need to be more specific to implement effectively in special education (Zhang and Deng, 2023) and digital learning (He et al., 2024; Ren et al., 2024; Yang et al., 2024). Other studies have found that academic functions are mainly achieved through the Chinese language (Zhang et al., 2020). As China becomes increasingly active in internationalizing higher education and aims to establish student education as an attractive high-quality brand, suggestions have been made to formulate corresponding policies based on different types of international students (Zhang and Liao, 2021). Public discussions primarily focus on the enrollment and employment issues, followed by the level and development of institutions (Li and Xue, 2022). The goal of the Greater Bay Area development strategy is to build an integrated, innovative, and internationalized economic system, which not only provides opportunities for universities to attract new funding but also prepares graduates to play a key role in the Greater Bay Area (Xie et al., 2021; Xu and Sukjairungwattana, 2022).

The Chinese government has shown continuous commitment and determination in formulating and implementing educational policies, aiming to improve the quality

of education, promote social equity, and cultivate talents capable of competing in a globalized context.

The aforementioned theoretical foundations validate the importance of sustainable development and internationalization in higher education, also demonstrating the attention Chinese government and institutions place on these areas. However, no studies have yet examined overall theme trends in research on Chinese higher education policies over the past two decades through systematic analysis. Exploring theme evolution in such research can uncover how Chinese higher education policy research topics have evolved, and further exploring the relationship between theme evolution and actual Chinese policy documents. This would not only reveal the current alignment of Chinese higher education policies with sustainable development goals in the country, but also evaluate whether trends increasingly integrate internationalization positively.

Therefore, this paper aims to address three research questions:

Q1: What are the evolutionary trends in research topics on Chinese higher education policies?

Q2: Do research trends on Chinese higher education policies reflect sustainable development of Chinese higher education?

Q3: Do research trends on Chinese higher education policies reflect internationalization of Chinese higher education?

To answer these questions, this study systematically reviews literature on Chinese higher education policies published between [2005] and [2024]. A thematic analysis is conducted to identify prominent themes over time. Results are then compared against key Chinese policy documents within the same period to assess the correspondence between research and policy focus on sustainability and internationalization. This systematic analysis sheds light on the directions and responsiveness of Chinese higher education policy and research.

3. Methodology

3.1. Bibliometrics and tool selection

This study adopts a bibliometric approach to analyze the relevant literature on Chinese higher education policies in the past 20 years. Bibliometrics is a method of statistical analysis of published literature (Garfield, 1955) that enhances the understanding of the knowledge structure in a particular field in an objective manner (Garfield, 1979). By quantifying the contributions of authors, journals, regions, and institutions in the field, bibliometrics can identify and quantify those who have made the greatest contributions in the field (Gil and Ulitsky, 2020). SciMAT is a tool based on network and bibliometric indicators (Cobo et al., 2011). Research has shown that SciMAT can effectively evaluate the development of research fields by constructing a scientific map and plotting the evolution path of research themes (Cobo et al., 2012; Herrera-Viedma et al., 2020; López-Robles et al., 2021). This methodological approach utilizes co-word analysis and the h-index (Callon et al., 1983; Garfield, 1986; Hirsch, 2005) to construct a visualization of research themes and their corresponding thematic network. The identified research themes are subsequently organized and categorized within a strategic diagram based on their centrality and density rank values

(Callon et al., 1991; He, 1999). Centrality measures the level of interaction between a network and others, while density assesses the internal strength of the network. By jointly considering these measures, the field of research can be graphically represented as a collection of research themes plotted on a two-dimensional strategic diagram **(Figure 1)**. Subsequently, these themes can be classified into four distinct categories as proposed by Cobo et al. (2011).

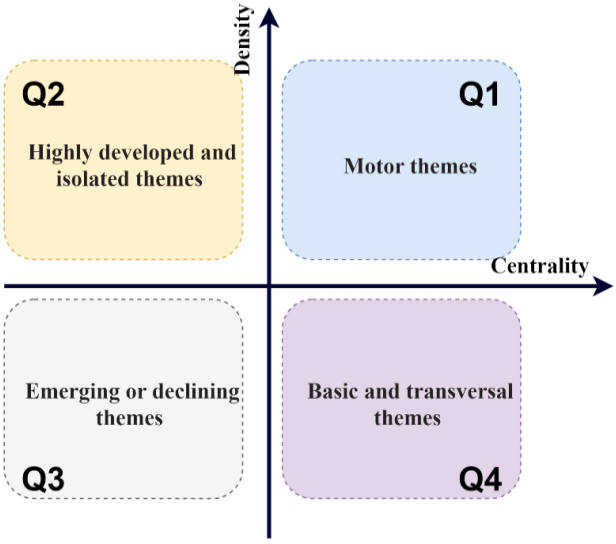
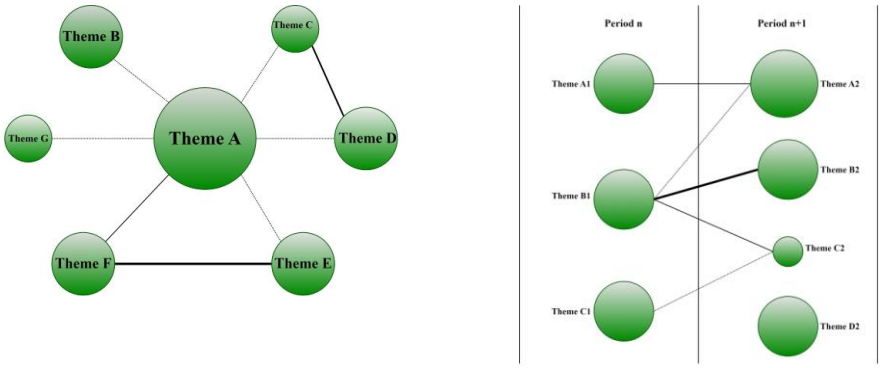


Figure 1. Strategic diagram.

The analysis of research themes is conducted using an evolution map (**Figure 2a**,**b**) that establishes connections between themes that exhibit a conceptual continuity across successive periods. Solid lines represent the linkages between periods when the connected themes share common keywords or when the label of one theme is subsumed within another. On the other hand, a dotted line indicates that the themes share keywords that do not necessarily indicate the main research topic of the preceding theme (Cobo et al., 2012; Moral-Muñoz et al., 2014).



(a) Evolution of Theme A **(b)** Evolution in different periods

Figure 2. Evolution map.

3.2. Data processing

3.2.1. Data collection

In April 2024, this study retrieved articles related to the "Chinese higher education policy" theme from the Web of Science Core Collection database on the Web of Science website. To ensure comprehensive retrieval of relevant literature, the search code used was TS = (("China" OR "Chinese") AND ("higher" OR "university" OR "college" OR "tertiary") AND ("education") AND ("policy" OR "policies" OR "strategy" OR "strategies")). The inclusion criteria for articles were publication dates ranging from 2005 to 2024, with the aim of analyzing the evolution of Chinese higher education policy themes over the past 20 years. Document type was set as 'articles', and language was English. A total of 3697 results were retrieved. It should be further noted that while the Chinese State Council issued the National Sustainable Development Action Plan for the Early 21st Century in 2003, the number of literature available to the researcher on research of Chinese higher education policies before 2005 was almost negligible. Moreover, to ensure consistency within segmented time periods for analysis using SciMAT software, the initial starting date was selected as 2005. As significant volumes of literature began emerging since then, selecting 2005 as the starting point also aims to capture meaningful evolution over reasonable durations for thematic comparison. Nonetheless, the year 2003 is acknowledged as an important milestone in China's emphasis on sustainable development. To the extent feasible within data limitations, the analysis seeks to situate identified research trends within the broader policy developments beginning in the early 2000s.

This systematic review was conducted on the basis of the framework of the Preferred Reporting Items for Systematic Reviews and Meta Analyses, PRISMA (Page et al. 2021). By taking advantage of PRISMA flowchart, this systematic review outlined the selection process of literature for inclusion and exclusion. Through selection, high quality articles can provide comprehensive insights into the classroom discourse and language interaction after COVID-19.

3.2.2. Data selection

In this study, the Document management function of the SciMAT tool was used to filter out 84 articles that had no words, resulting in a remaining total of 3,613 articles. The "Find similar words by plurals (automatic)" function of the SciMAT tool was used to merge certain words, and manual merging of synonymous words was also performed. For example, the words "ability" and "capacity" were merged into "ability". To avoid interference from words or phrases that are likely to appear in almost every article, the words and their combinations and phrases in the search code were deleted. This includes terms such as "China", "Chinese higher education", "Chinese tertiary education", "Higher education policy", "Educational strategy", "university", "college", "education", "policy", "policies", "strategy", and "strategies".

Next, the data was divided into different time periods. As the aim of this study is to analyze the evolution of Chinese higher education policy themes over the past 20 years, the years 2005 to 2009 were categorized as T1, 2010 to 2014 as T2, 2015 to 2019 as T3, and 2020 to 2024 as T4, ensuring a smooth progression of data.

3.2.3. Parameter settings

For each time period, specific parameter settings and indices were established, with the analysis unit encompassing authors and research topics. After repeated experiments, the optimal effectiveness of the evolution map was achieved under the

following parameter settings. The data reduction threshold for each time period was set as (2,2,3,3), and the co-occurrence matrix was selected as the matrix type. The network reduction threshold was also set to (2,2,3,3), and the association strength served as the similarity index for the normalized network. In this study, the clustering algorithm employed was the simple central algorithm. The maximum network value was set to 10, while the minimum network value was set to 3. The core drawing method and h-index were utilized. In the web environment, when generating a co-occurrence matrix, which is often the case in webometric research, the Jaccard index is considered the most suitable for normalization (Leydesdorff, 2007). Therefore, the Jaccard coefficient was chosen as the similarity index for both the subject evolution map and the topic overlap map.

4. Results

4.1. Publications and citations

The number of publications over the twenty-year period from 2005 to 2024 is shown in **Figure 3**. The quantity of publications in each time period, T1 to T4, has rapidly increased two times. The publication peaks for each time period were observed in 2009 for T1, 2013 for T2, 2019 for T3, and 2023 for T4 (The analysis was conducted in April 2024, so the statistics for 2024 only include publications prior to that date).

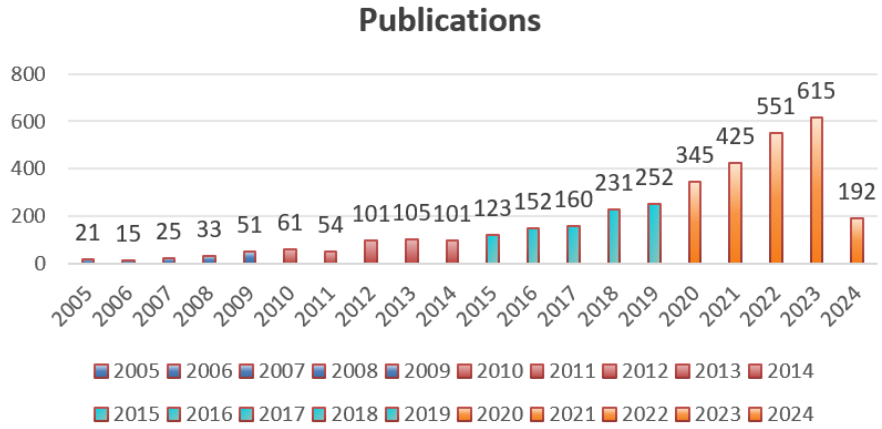


Figure 3. Documents per period.

Most productive and cited authors, and research areas

Identifying the most productive and highly cited authors, as well as the research areas, is an important aspect of bibliometric analysis as it supports the evaluation of research field evolution (Aria and Cuccurullo, 2017). **Table 1** presents the top ten authors with the highest productivity and most cited authors in Chinese higher education policy research from 2005 to 2024. The rankings of the most productive authors and the most cited authors have some differences. According to WoS and **Table 1**, seven authors are both among the most productive and most cited: Li Jian (19 publications; 151 citations), Li Hui (11 publications; 182 citations), Wang Yan (8 publications; 147 citations), Wang Jian (8 publications; 229 citations), Liu Yang (8 publications; 156 citations), and Zhang Yan (7 publications; 185 citations).

Table 1. Most productive authors (2005–2024).

Publications	Author	Citations	Author
19	Li, Jian	246	Liu, Jing
16	Xue, Eryong	220	Wang, Jian
7	Li, Jun	212	Zhang, Lei
11	Li, Hui	185	Zhang, Yan
8	Wang, Yan	182	Li, Hui
8	Wang, Jian	181	Wang, Ying
8	Liu, Yang	156	Liu, Yang
8	Li, Ying	151	Li, Jian
7	Zhang, Yan	147	Wang, Yan
7	Wang, Ying	139	Ye Li

Following the same method, this study conducted an analysis to identify the top ten countries and regions, as well as organizations, with the highest productivity in Chinese higher education policy research from 2005 to 2024.

According to **Table 2**, in terms of publication quantity, Mainland China (People's Republic of China) has the highest number of publications in the field of Chinese higher education policy research, with a total of 2791 papers, Taiwan (132 papers), far surpassing other countries/regions. Furthermore, other countries with significant publications include the USA (651 papers), England (316 papers), Australia (310 papers), and Canada (121 papers).

Table 2. Most productive countries (2005–2024)

Publications	Countries/Regions	Publications	Organization
2791	People's Republic of China	161	Peking University
651	USA	137	University of Hong Kong
316	England	130	Beijing Normal University
310	Australia	115	Chinese University of Hong Kong
132	Taiwan	101	Zhejiang University
121	Canada	100	Education University of Hong Kong (EdUHK)
85	Malaysia	84	Fudan University
83	Singapore	78	University of London
66	Japan	64	Shanghai Jiao Tong University
65	South Korea	64	Tsinghua University

In terms of institutional distribution, major institutions in the field of Chinese higher education policy research include Peking University, University of Hong Kong, Beijing Normal University, and Chinese University of Hong Kong.

As shown in **Table 3**, the top ten research fields and categories with the highest number of publications in Chinese higher education policy from 2005 to 2024 are presented. In terms of research categories, the most prevalent category is Education Educational Research, with 1250 papers.

Table 3. Most relevant WoS subject categories and research areas (2005–2024).

Publications	WoS subject categories	Publications	Research areas
1250	Education Educational Research	1302	Education Educational Research
441	Public Environmental Occupational Health	441	Public Environmental Occupational Health
340	Environmental Sciences	405	Environmental Sciences Ecology
251	Economics	400	Business Economics
238	Environmental Studies	295	Science Technology Other Topics
218	Green Sustainable Science Technology	264	Psychology
205	Linguistics	214	Linguistics
180	Psychology Multidisciplinary	186	Social Sciences Other Topics
158	Language Linguistics	140	Nursing
150	Social Sciences Interdisciplinary	97	Health Care Sciences Services

Lastly, **Table 4** demonstrates the top ten journals with the highest number of publications, highlighting the diversity of journals in which Chinese higher education policy-related research is published. The most published journal is Sustainability.

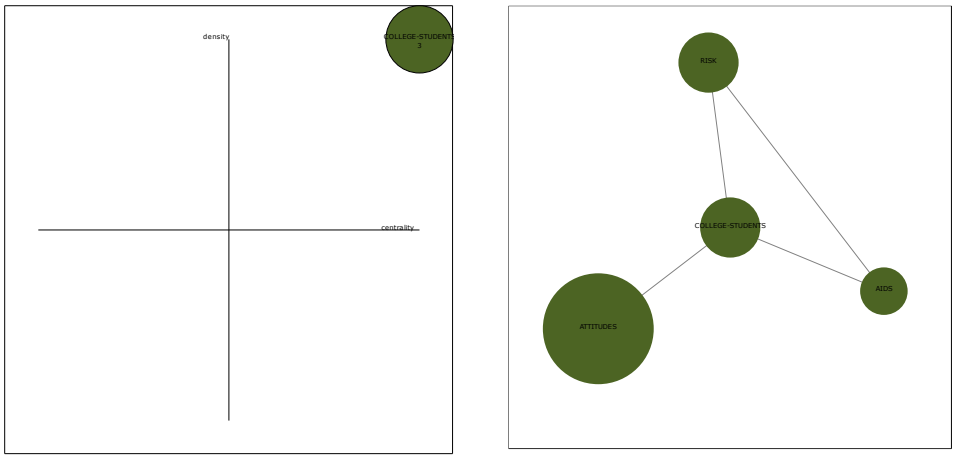
Table 4. Journals with the highest numbers of publications (2005–2024).

Name	Publications related to Chinese higher education policies	Journal Impact Factor (JIF-2021/2022)	5-Year Impact Factor	Journal Citation Indicator (JCI-2021/2022)
Sustainability	160	3.9	4	0.67
Frontiers in Psychology	126	3.8	4.3	1.04
Frontiers in Public Health	96	5.2	5.5	1.19
Higher Education	85	5	5.2	2.06
International Journal of Environmental Research and Public Health	85	4.614	4.799	0.93
PLOS ONE	50	3.7	3.8	0.91
Frontiers of Education in China	43	2.8	1.8	0.59
Higher Education Policy	39	1.6	1.8	1
China Economic Review	38	6.8	6.8	1.84
Asia Pacific Education Review	35	2.3	2.4	1.07

4.2. Science mapping analysis of Chinese higher education policy strategic diagrams

Over the past 20 years, four strategic diagrams can be constructed to depict the different stages of Chinese higher education policy. In the T1 period (2005–2009), as shown in **Figure 4a**, only one main theme, namely COLLEGE-STUDENT, is identified, and it is located in the Q1 quadrant. This indicates that during the T1 period, the focus of Chinese higher education policy was primarily on students themselves. In **Figure 4b**, there are strong associations between the main theme COLLEGE-

STUDENT and themes such as RISK, AIDS, and ATTITUDES. This suggests that in addition to student attitudes towards their academic life, there was also a considerable focus on public health issues on campuses.



(a) Thematic cluster network **(b)** College-students

Figure 4. Strategic diagram and performance from 2005 to 2009

As shown in **Figure 5**, during the T2 period (2010–2014), five themes were identified: ACHIEVEMENT, ATTITUDES, LANGUAGE, INTERVENTION, and SOCIAL-SUPPORT, the five thematic cluster networks are included in Appendix A. The dominant theme during this period was SOCIAL-SUPPORT. The theme ATTITUDES from the T1 period appeared in the Basic and Transversal Themes quadrant in the T2 period, and ACHIEVEMENT also fell within the same quadrant. LANGUAGE and INTERVENTION were categorized as Highly Developed and Isolated Themes during this period.

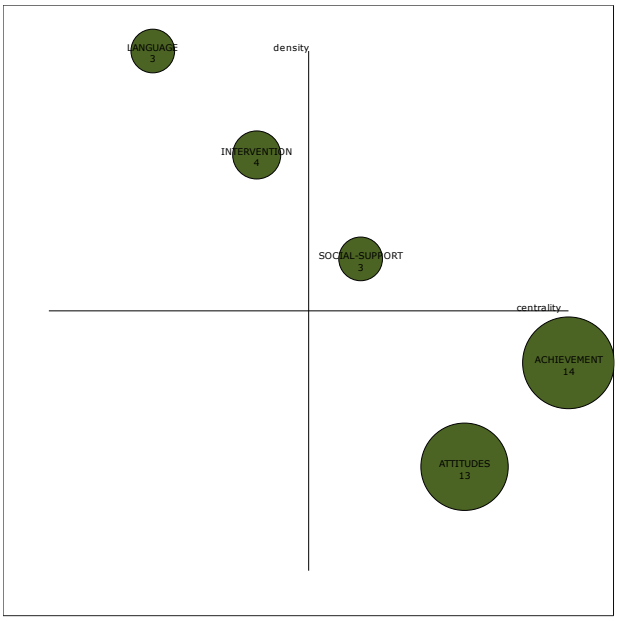


Figure 5. Strategic diagram and performance from 2010 to 2014.

As depicted in **Figure 6**, during the T3 period (2015–2019), six themes were identified. Among them, ASSOCIATION and INEQUALITY were categorized as

Motor themes. INTERNATIONAL-STUDENTS remained as Highly developed and isolated themes, similar to the T2 period. ATTITUDES continued to be classified as Basic and transversal themes. SYSTEM emerged as an Emerging or declining theme, while TEACHERS occupied a central position within the diagram. The six cluster networks are included in Appendix B.

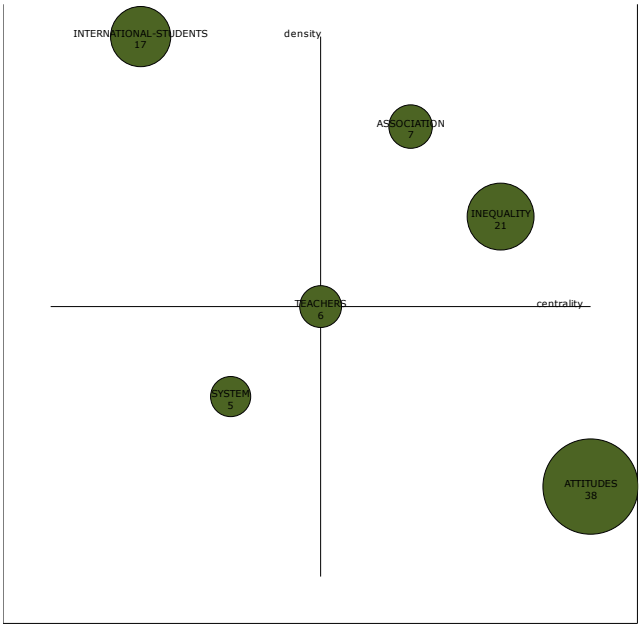


Figure 6. Strategic diagram and performance from 2015 to 2019.

As illustrated in **Figure 7**, during the T4 period (2020–2024), nine themes were identified. Among them, CLASSROOM was classified as a Motor theme. BEHAVIOR, DETERMINANTS, EXPERIENCES, and STUDENTS were categorized as Basic and transversal themes. INNOVATION, DEMAND, INTERNATIONAL-STUDENTS, and CITIES were considered Highly developed and isolated themes. The nine cluster networks are included in Appendix C.

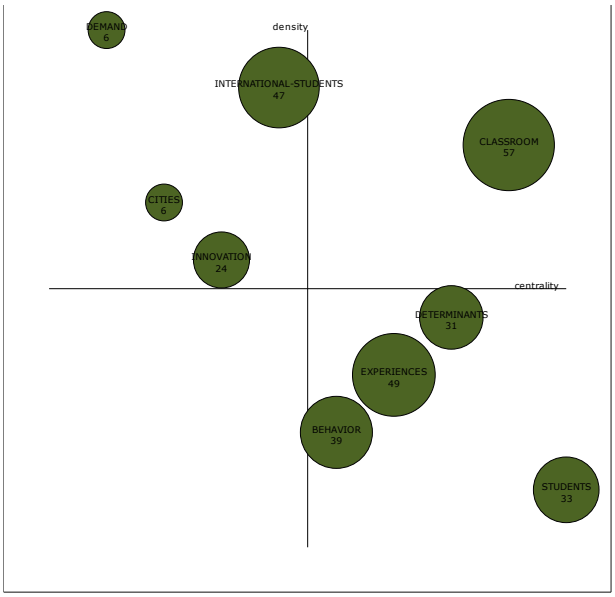


Figure 7. Strategic diagram and performance from 2020 to 2024.

5. Discussion

In this section, the researchers conducted a bibliometric analysis by examining publication records, citation counts, journal impact factors, most cited publications, most cited authors, h-index, research fields, and geographic distribution of publications. These bibliometric indicators were used to discuss the evolution of Chinese higher education policy in terms of publications, citations, and impact. Furthermore, the analysis aimed to explore the influence of Chinese higher education policy on global competitiveness and sustainable development.

5.1. Trends in research topics on Chinese higher education policies

5.1.1. Publication quantity trends

As shown in **Figure 3**, the number of publications increased substantially year-on-year, reflecting growing scholarly attention to research on Chinese higher education policies since 2005. Significant surges were seen in 2012 and 2018, closely associated with major higher education policy releases in those years.

2012 was a pivotal year for fully implementing China's National Medium- and Long-Term Education Reform and Development Plan (2010–2020). Under this overarching framework, continuous strengthening of top-level design and formation of more scientific institutional arrangements laid a solid foundation for comprehensive reform. The State Council also promulgated the Measures for Supervision of Education to ensure priority development, establishing the highest-level supervision institution in New China - the State Council Education Supervision Committee.

In 2018, amendments to the Higher Education Law of the People's Republic of China were made alongside release of the Measures for Promoting School-Enterprise Cooperation in Vocational Schools, demonstrating strengthened emphasis on vocational education. Other policy documents issued included measures regarding public funding of normal students in teacher colleges directly under the Ministry of Education and opinions on accelerating the cultivation of high-quality undergraduate talent, reflecting the Chinese government's resolve to greatly advance teacher education and undergraduate education.

Through deepening integrated production-education, improving public funding mechanisms and fully enhancing talent cultivation quality, continuous reform and innovation have been driven in Chinese higher education to strongly support socio-economic development with skilled human resources.

5.1.2. Thematic strategy coordinates

The changes in themes across the four periods, from T1 to T4, in the different quadrants reflect the evolving trends and shifting focus of Chinese higher education policy research. The transformation of ATTITUDES from a prominent theme to a basic and transversal theme, the increasing importance of research on international students and teachers, and the emergence of themes related to innovation models, changing demands, and urban education development all demonstrate the research trends towards sustainable development and internationalization in Chinese higher education policy.

5.1.3. Evolution of themes

As shown in **Figure 8**, the flow of themes across the T1 to T4 periods is presented. **Figure 9** illustrates the evolution of themes from T1 to T4. In the T1 period, the main theme was COLLEGE-STUDENTS, which had a strong association with ATTITUDES in the T2 period and a weak association with INTERVENTION in the same period. Additionally, ACHIEVEMENT, LANGUAGE, and SOCIAL-SUPPORT emerged as individual themes in the T2 period.

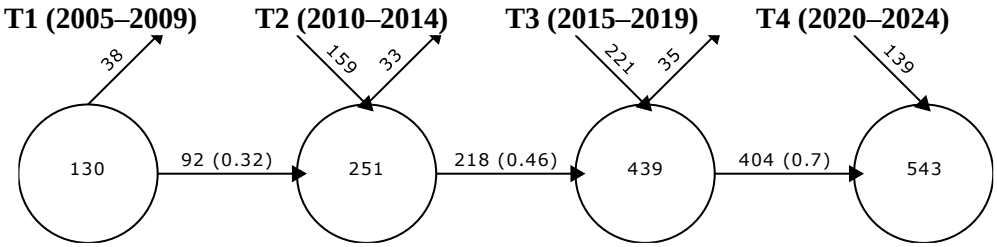


Figure 8. Overlapping map.

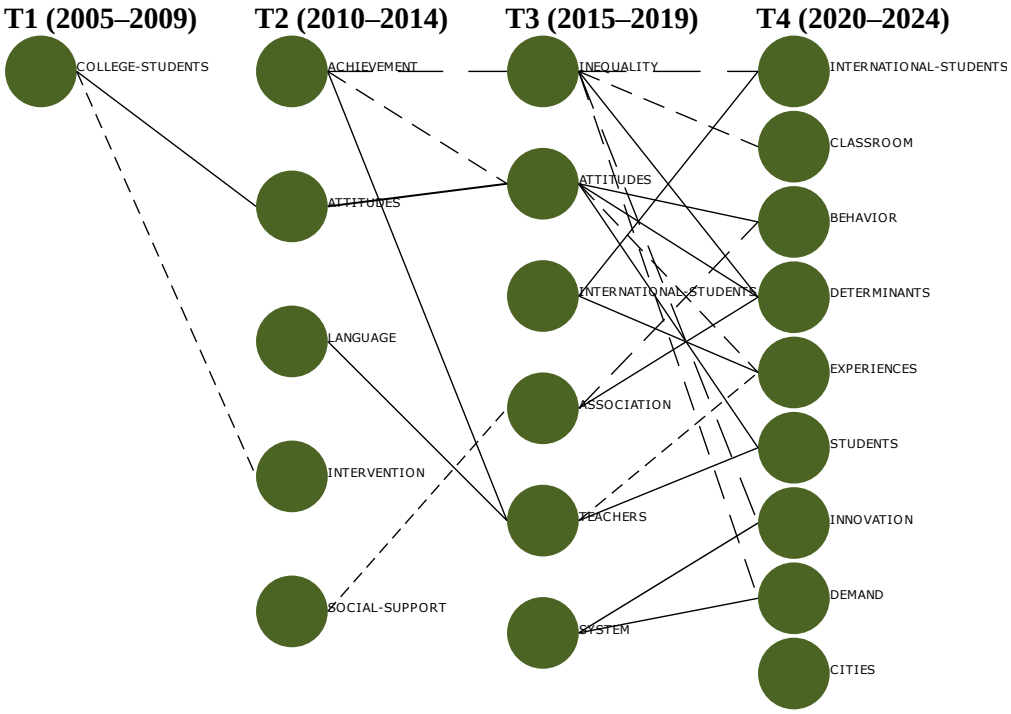


Figure 9. Evolution maps.

In the T2 period, ATTITUDES remained strongly associated with the T3 period, while ACHIEVEMENT was strongly associated with TEACHERS in the T3 period and weakly associated with INEQUALITY and ATTITUDES. LANGUAGE from the T2 period was strongly associated with TEACHERS in the T3 period, and SOCIAL-SUPPORT weakly associated with ASSOCIATION in the T4 period.

In the T3 period, two individual themes emerged, namely INTERNATIONAL-STUDENTS and SYSTEM. INEQUALITY in the T3 period was weakly associated with CLASSROOM, INTERNATIONAL-STUDENTS, DETERMINANTS, INNOVATION, and DEMAND in the T4 period. ATTITUDES in the T3 period was

strongly associated with BEHAVIOR and DETERMINANTS in the T4 period, and weakly associated with EXPERIENCES and STUDENTS.

INTERNATIONAL-STUDENTS in the T3 period had a strong association with INTERNATIONAL-STUDENTS and EXPERIENCES in the T4 period. ASSOCIATION in the T3 period was strongly associated with DETERMINANTS in the T4 period. TEACHERS in the T3 period had a strong association with STUDENTS and a weak association with EXPERIENCES in the T4 period. SYSTEM in the T3 period was strongly associated with INNOVATION and DEMAND in the T4 period. Lastly, the individual theme CITIES emerged in the T4 period.

5.2. Reflection of sustainable development in Chinese higher education policies

In 2012, the Chinese State Council specifically issued opinions on increasing investment in education, as well as policies such as unifying domestic and foreign-funded enterprises and individuals' education donations, comprehensively levying local education donations, and allocating a proportion of proceeds from land transfers to education funds. The Ministry of Education jointly established the "4%" Office with the Ministry of Finance and the National Development and Reform Commission to strengthen comprehensive coordination and supervision. Local governments earnestly implemented a series of central policy measures, igniting an upsurge of making full efforts and substantially increasing fiscal investment in education. This reflected the target of sustainable development planning in China's "National Sustainable Development Action Plan for Early 21st Century".

Furthermore, as in **Table 3** the Public Environmental Occupational Health (441 papers), Environmental Sciences (340 papers), Green Sustainable Science Technology (218 papers), and Social Sciences, Interdisciplinary (150 papers) rank among the top ten, which reflects the emphasis on sustainable development in Chinese higher education policies.

Lastly, **Table 4** demonstrates the top ten journals with the highest number of publications, highlighting the diversity of journals in which Chinese higher education policy-related research is published. The most published journal is Sustainability, indicating the importance placed on sustainable development in Chinese higher education policy research in the past two decades.

5.3. Reflection of internationalization in Chinese higher education policies

While the majority of authors come from China (**Table 1**), according to **Table 2**, Mainland China (People's Republic of China) has the highest number of publications in the field of Chinese higher education policy research, with a total of 2791 papers, far surpassing Taiwan (132 papers) and other countries/regions. This indicates that scholars in China are highly active in researching their own country's higher education policies. Furthermore, other countries with significant publications include the USA (651 papers), England (316 papers), Australia (310 papers), and Canada (121 papers), reflecting the attention that higher education policies receive globally from various countries, indirectly showing the internationalization of Chinese higher education.

Additionally, as shown in **Table 3**, categories like Economics (400 papers), Linguistics (205 papers), and Language Linguistics (158 papers) being among the top ten categories reflect the globalization of research on Chinese higher education policy. This widening publication base across geographic boundaries and disciplinary divides signals expanding international engagement and scholarly exchange on Chinese higher education development at the global level.

6. Conclusion

Based on the bibliometric analysis of Chinese higher education policy research literature from 2005 to 2024, this study reveals a continuous growth in the field, indicating sustained scholarly attention. Mainland China leads in terms of publication output, highlighting the active involvement of Chinese scholars in researching their own higher education policies. Institutions such as Peking University, the University of Hong Kong, and Beijing Normal University play important roles in this research.

The research focus has gradually shifted from student attitudes to international students, teachers, innovation models, changing demands, and urban education development, reflecting an increasing emphasis on sustainable development and internationalization. In summary, the field of Chinese higher education policy research is developing rapidly, with an expanding research focus and a deepening concern for sustainable development and internationalization.

However, it is important to acknowledge the limitations of this study, as the bibliometric analysis only considered literature in specific languages. Future research should incorporate literature in multiple languages to provide a more comprehensive analysis. Additionally, while continuing to monitor the trends of sustainable development and internationalization in Chinese higher education policy, it would be valuable to pay greater attention to the influence of urban education development on higher education policies and practices, exploring how the process of urbanization shapes educational policies and practices.

Author contributions: Conceptualization, PS, HH and WX; methodology, PS and HH; software, HH; validation, HH, ZL and WL; formal analysis, PS, HH and WX; investigation, PS and ZL; resources, PS and ZL; data curation, ZL and WL; writing—original draft preparation, PS and HH; writing—review and editing, PS, HH and WL; visualization, HH and WX; supervision, PS and WX. All authors have read and agreed to the published version of the manuscript.

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References

Aleixo, A. M., Leal, S., & Azeiteiro, U. M. (2018). Conceptualization of sustainable higher education institutions, roles, barriers, and challenges for sustainability: An exploratory study in Portugal. Journal of Cleaner Production, 172, 1664–1673. https://doi.org/10.1016/j.jclepro.2016.11.010

Aria, M., & Cuccurullo, C. (2017). bibliometrix : An R-tool for comprehensive science mapping analysis. Journal of Informetrics, 11(4), 959–975. https://doi.org/10.1016/j.joi.2017.08.007

Braun Střelcová, A., Cai, Y., & Shen, W. (2022). The Experience of European Researchers in China: A Comparative Capital Advantage Perspective. Journal of the Knowledge Economy, 14(3), 2663–2691. https://doi.org/10.1007/s13132-022-00982-3

Buturlina, O., Dovhal, S., Hryhorov, H., et al. (2021). STEM Education in Ukraine in the Context of Sustainable Development. European Journal of Sustainable Development, 10(1), 323. https://doi.org/10.14207/ejsd.2021.v10n1p323

Cobo, M. J., López-Herrera, A. G., Herrera-Viedma, E., et al. (2011). An approach for detecting, quantifying, and visualizing the evolution of a research field: A practical application to the Fuzzy Sets Theory field. Journal of Informetrics, 5(1), 146–166. https://doi.org/10.1016/j.joi.2010.10.002

Cobo, M. J., López-Herrera, A. G., Herrera-Viedma, E., et al. (2012). SciMAT: A new science mapping analysis software tool. Journal of the American Society for Information Science and Technology, 63(8), 1609–1630. Portico. https://doi.org/10.1002/asi.22688

Dong, Y., Yu, N., Hong, T., et al. (2022). City Administrative Level and Tertiary Educational Opportunities: Evidence From China's Higher Education Expansion Policy. SAGE Open, 12(2), 215824402210899. https://doi.org/10.1177/21582440221089931

Ferencz, V., Hrehová, D., & Seňová, A. (2020). Higher education require adaptation of students study abroad programs. SHS Web of Conferences, 74, 02003. https://doi.org/10.1051/shsconf/20207402003

Filho, W. L. (2011). About the Role of Universities and Their Contribution to Sustainable Development. Higher Education Policy, 24(4), 427–438. https://doi.org/10.1057/hep.2011.16

Garfield, E. (1955). Citation Indexes for Science. Science, 122(3159), 108–111. https://doi.org/10.1126/science.122.3159.108

Garfield, E. (1979). Is citation analysis a legitimate evaluation tool? Scientometrics, 1(4), 359–375. https://doi.org/10.1007/bf02019306

Ge, N., Wang, E., & Li, Y. (2023). Foreign Language Education for Sustainable Development in China: A Case Study of German Language Education. Sustainability, 15(8), 6340. https://doi.org/10.3390/su15086340

Gil, N., & Ulitsky, I. (2019). Regulation of gene expression by cis-acting long non-coding RNAs. Nature Reviews Genetics, 21(2), 102–117. https://doi.org/10.1038/s41576-019-0184-5

He, R., Xu, W., Dong, D., et al. (2024). A Meta-Analysis of the Effect of Interactive Technologies on Language Education. International Journal of Adult Education and Technology, 15(1), 1–28. https://doi.org/10.4018/ijaet.340933

Herrera-Viedma, E., López-Robles, J.-R., Guallar, J., et al. (2020). Global trends in coronavirus research at the time of Covid-19: A general bibliometric approach and content analysis using SciMAT. El Profesional de La Información, 29(3). https://doi.org/10.3145/epi.2020.may.22

Hu, H., Li, F., & Luo, Z. (2024). The evolution of China's English education policy and challenges in higher education: analysis based on LDA and Word2Vec. Frontiers in Education, 9. https://doi.org/10.3389/feduc.2024.1385602

Huang, Y., Xu, W., Sukjairungwattana, P., et al. (2024). Learners' continuance intention in multimodal language learning education: An innovative multiple linear regression model. Heliyon, 10(6), e28104. https://doi.org/10.1016/j.heliyon.2024.e28104

Karpan, I., Chernikova, N., Motuz, T., et al. (2020). Conceptual Principles of Education for Sustainable Development. European Journal of Sustainable Development, 9(2), 99–114. https://doi.org/10.14207/ejsd.2020.v9n2p99

Katayama, J., Örnektekin, S., & Demir, S. S. (2017). Policy into practice on sustainable development related teaching in higher education in Turkey. Environmental Education Research, 24(7), 1017–1030. https://doi.org/10.1080/13504622.2017.1360843

Kretschmann, J., Pevneva, I., Ivanova, S., et al. (2020). Integration and Innovation Determinants of Modern Mining Higher Education Development. E3S Web of Conferences, 174, 04035. https://doi.org/10.1051/e3sconf/202017404035

Leal Filho, W., Manolas, E., & Pace, P. (2008). Education for sustainable development: current discourses and practices and their relevance to technology education. International Journal of Technology and Design Education, 19(2), 149–165. https://doi.org/10.1007/s10798-008-9079-z

Leydesdorff, L. (2007). On the normalization and visualization of author co-citation data: Salton's Cosine versus the Jaccard index. Journal of the American Society for Information Science and Technology, 59(1), 77–85. Portico. https://doi.org/10.1002/asi.20732

Li, J., & Xue, E. (2022). A Social Networking Analysis of Education Policies of Creating World-Class Universities for Higher Education Sustainability in China. Sustainability, 14(16), 10243. https://doi.org/10.3390/su141610243

López-Robles, J. R., Cobo, M. J., Gutiérrez-Salcedo, M., et al. (2021). 30th Anniversary of Applied Intelligence: A combination of bibliometrics and thematic analysis using SciMAT. Applied Intelligence, 51(9), 6547–6568. https://doi.org/10.1007/s10489-021-02584-z

Ma, G., Shi, W., & Hou, P. (2022). Exploring University Teacher Construction for Higher Education Sustainability in China: Perspective from Policy Instruments. Sustainability, 15(1), 362. https://doi.org/10.3390/su15010362

Mawarti, S., & Nurlaelah, E. (2020). Social justice in mathematics education for sustainable development. Journal of Physics: Conference Series, 1521(3), 032094. https://doi.org/10.1088/1742-6596/1521/3/032094

Nasibulina, A. (2015). Education for Sustainable Development and Environmental Ethics. Procedia - Social and Behavioral Sciences, 214, 1077–1082. https://doi.org/10.1016/j.sbspro.2015.11.708

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. bmj, 372. doi: https://doi.org/10.1136/bmj.n71

Ren, J., Xu, W., & Liu, Z. (2024). The Impact of Educational Games on Learning Outcomes. International Journal of Game-Based Learning, 14(1), 1–25. https://doi.org/10.4018/ijgbl.336478

Sart, G. (2022). Impact of Higher Education and Globalization on Sustainable Development in the New EU Member States. Sustainability, 14(19), 11916. https://doi.org/10.3390/su141911916

Strielkowski, W., Grebennikova, V., Razinkina, E., et al. (2021). Relationship between globalization and internationalization of higher education. E3S Web of Conferences, 301, 03006. https://doi.org/10.1051/e3sconf/202130103006

Tight, M. (2019). Globalization and internationalization as frameworks for higher education research. Research Papers in Education, 36(1), 52–74. https://doi.org/10.1080/02671522.2019.1633560

Wang, Y., Xu, W., Guan, K., et al. (2024). English Teachers' Post-Pandemic Motivation in Macau's Higher Education System. Theory and Practice in Language Studies, 14(7), 1990–2001. https://doi.org/10.17507/tpls.1407.05

Wen, G. J. (2020). Virtuous globalization, the three-zeros policy, and China's choice. Journal of Chinese Economic and Business Studies, 19(3), 221–237. https://doi.org/10.1080/14765284.2020.1862637

Xiang-chao, P. (2019). Research on the Predicament and Countermeasures of Sustainable Development Education in Colleges and Universities. IOP Conference Series: Earth and Environmental Science, 295(2), 012042. https://doi.org/10.1088/1755-1315/295/2/012042

Xie, A., Postiglione, G. A., & Huang Q. (2020). The Greater Bay Area (GBA) Development Strategy and Its Relevance to Higher Education. ECNU Review of Education, 4(1), 210–221. https://doi.org/10.1177/2096531120964466

Xu, W., & Sukjairungwattana, P. (2022). The Study of Macau's Higher Education 1999–2019. Frontiers in Education, 7. https://doi.org/10.3389/feduc.2022.898238

Xu, W., Zhang, H., Sukjairungwattana, P., et al. (2022). The roles of motivation, anxiety and learning strategies in online Chinese learning among Thai learners of Chinese as a foreign language. Frontiers in Psychology, 13. https://doi.org/10.3389/fpsyg.2022.962492

Yang, S., Xu, W., Liu, R., et al. (2024). Influencing and moderating variables in informal digital learning of English through a structural equation model. Computer Assisted Language Learning, 1–36. https://doi.org/10.1080/09588221.2023.2280645

Yang, X., & You, Y. (2017). How the World-Class University Project Affects Scientific Productivity? Evidence from a Survey of Faculty Members in China. Higher Education Policy, 31(4), 583–605. https://doi.org/10.1057/s41307-017-0073-5

Yelubayeva, P., Tashkyn, E., & Berkinbayeva, G. (2023). Addressing Challenges in Kazakh Education for Sustainable Development. Sustainability, 15(19), 14311. https://doi.org/10.3390/su151914311

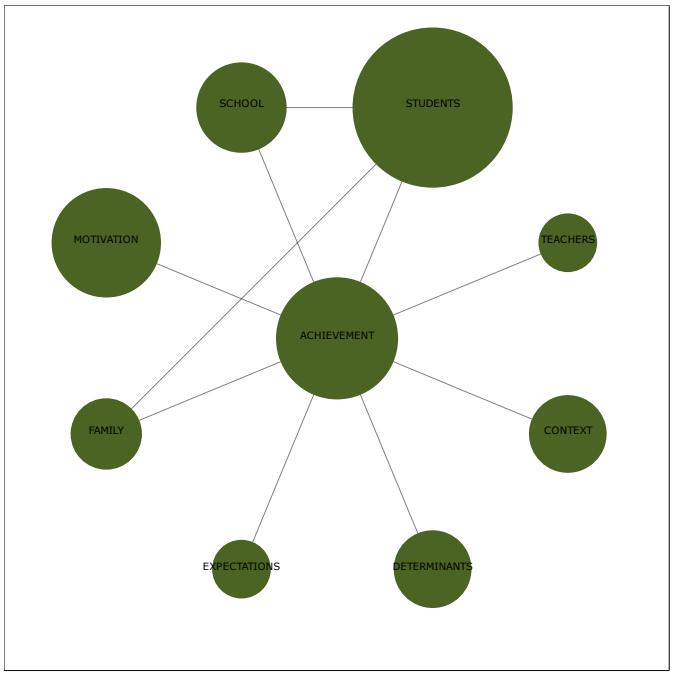
Yu, Z., Xu, W., & Sukjairungwattana, P. (2022). A meta-analysis of eight factors influencing MOOC-based learning outcomes across the world. Interactive Learning Environments, 32(2), 707–726. https://doi.org/10.1080/10494820.2022.2096641

Zhang, L., & Deng, Y. (2023). Toward a High-Quality System: A Critique of Chinese Special Education Policy Development and the Guidelines for the Evaluation of the Quality of Special Education Schools. ECNU Review of Education. https://doi.org/10.1177/20965311231210307

Zhang, L., Tsung, L., & Zhuoma. (2020). Exploring Sustainable Multilingual Language Policy in Minority Higher Education in China: A Case Study of the Tibetan Language. Sustainability, 12(18), 7267. https://doi.org/10.3390/su12187267

Zhang, Y., & Liao, Y. (2021). Higher Education for International Students in China: A Review of Policy From 1978 to 2020. ECNU Review of Education, 4(4), 873–889. https://doi.org/10.1177/2096531120974382

Appendix A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TEACHERS
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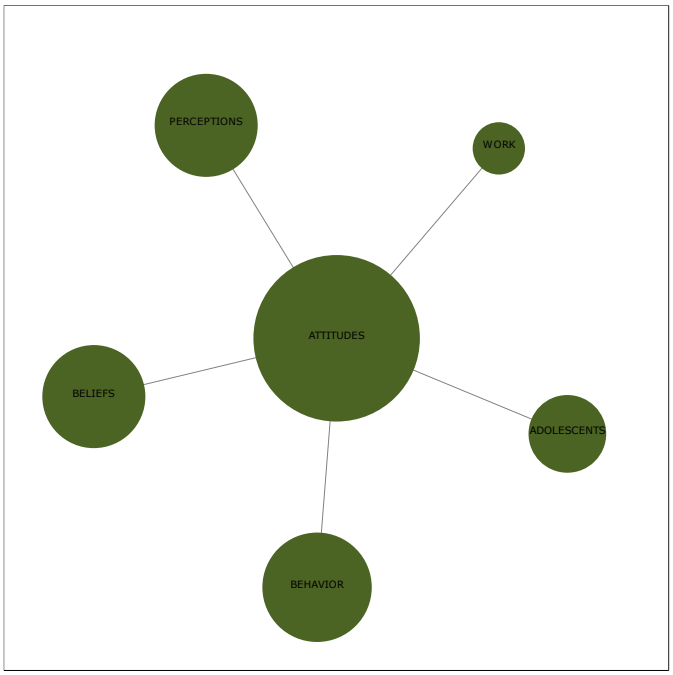
EXPECTATIONS
DETERMINANTS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ATTITUDES
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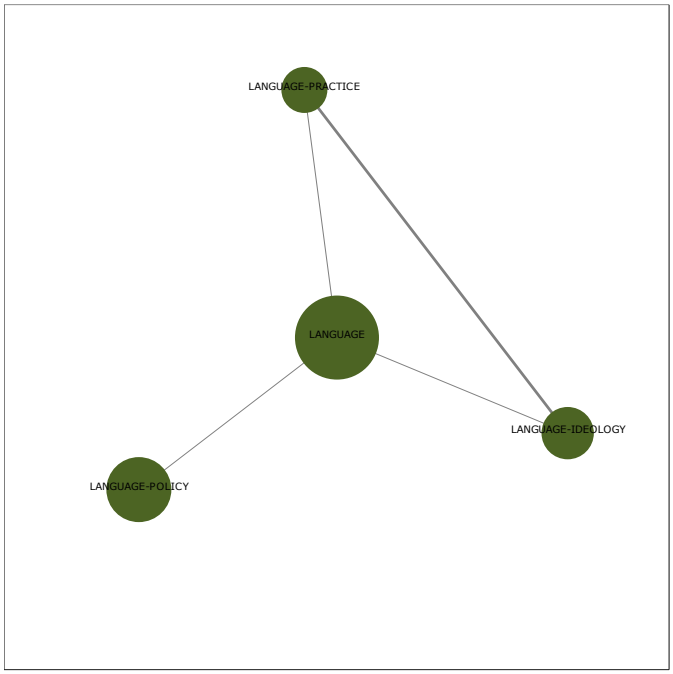
ADOLESCENTS
BEHAVIOR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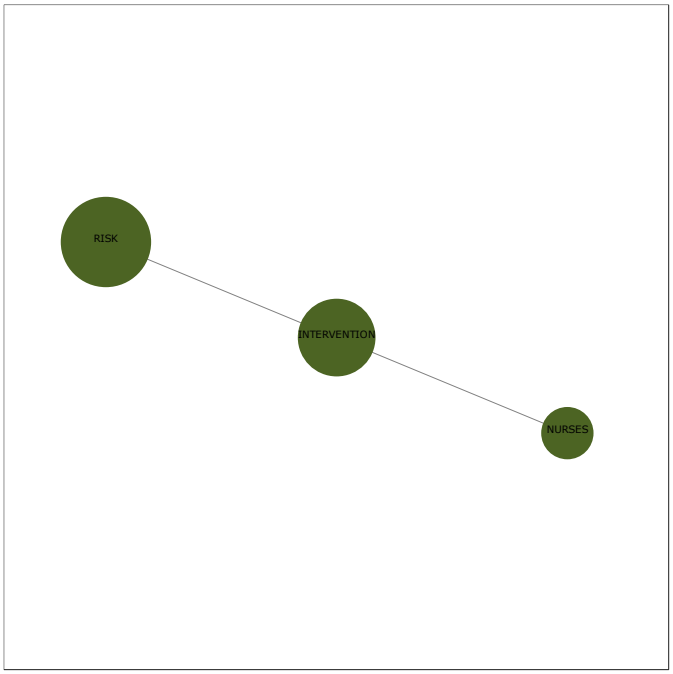
LANGUAGE
LANGUAGE-IDEOLOGY
LANGUAGE-POLICY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NURSES

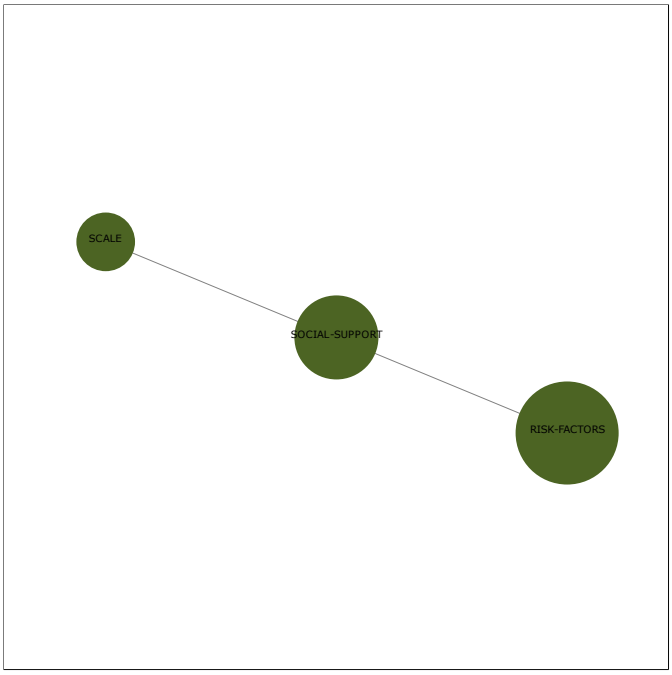
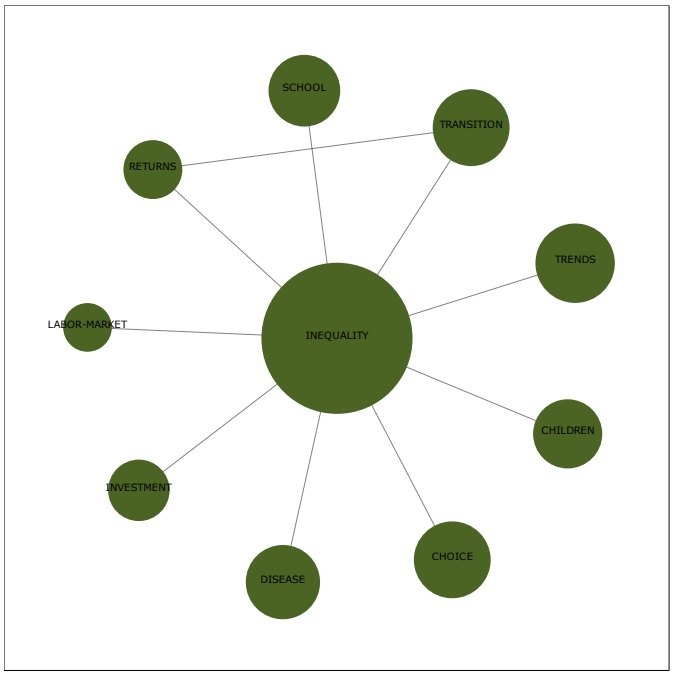


Figure A1. 2010–2014 cluster networks.

Appendix B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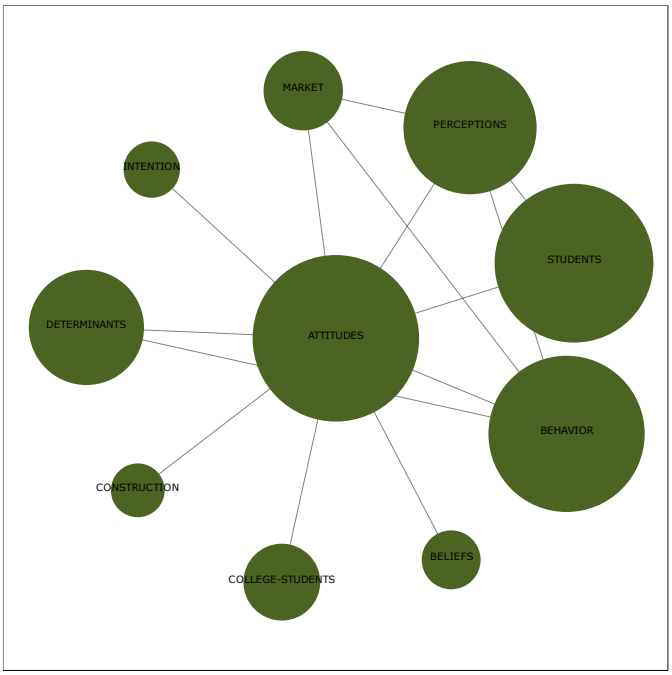
LABOR-MARKET
INEQUALITY
CHILDREN
INVESTMENT
DISEASE
CHOICE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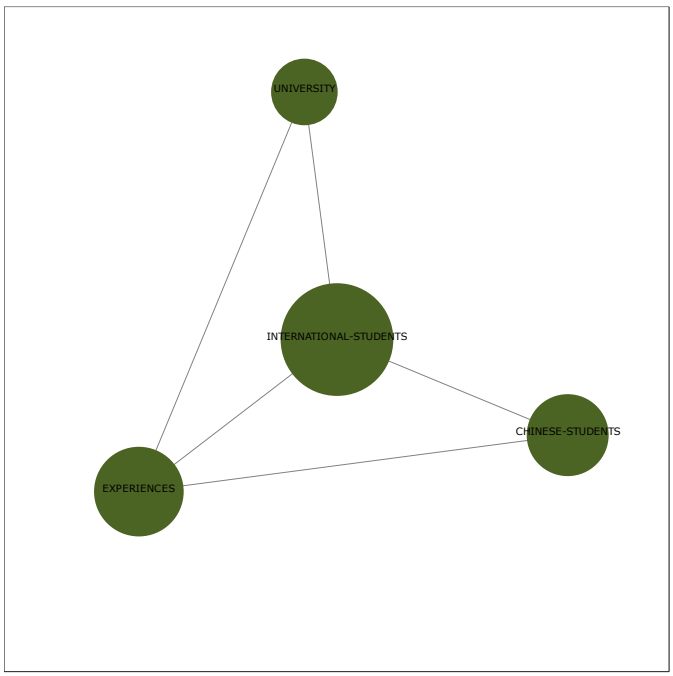
INTENTION
STUDENTS
DETERMINANTS
ATTITUDES
BEHAVIOR
CONSTRUCTION
BELIEFS
COLLEGE-STUDENTS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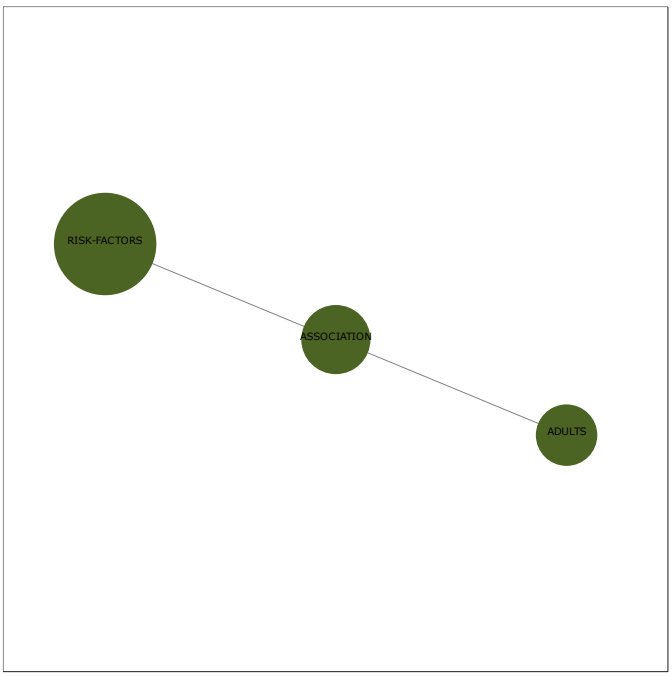
CHINESE-STUDENTS
EXPERIENCES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ASSOCIATION
ADULTS

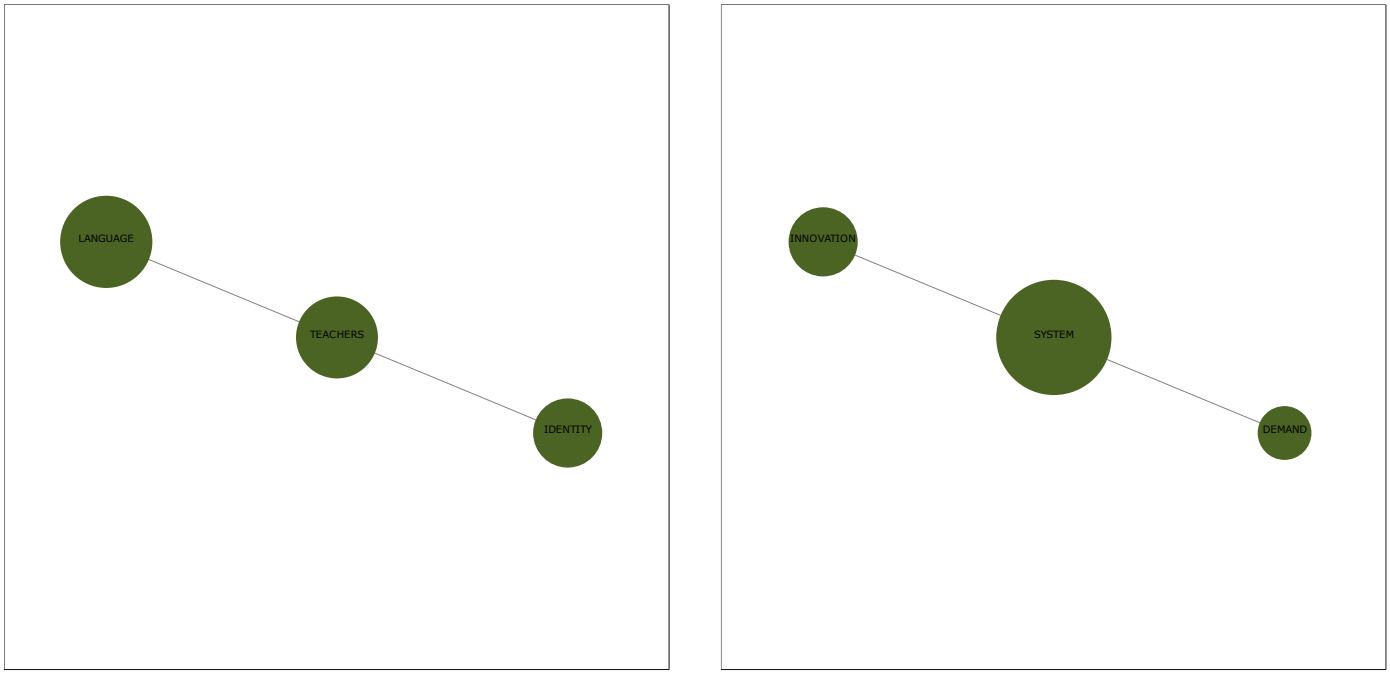
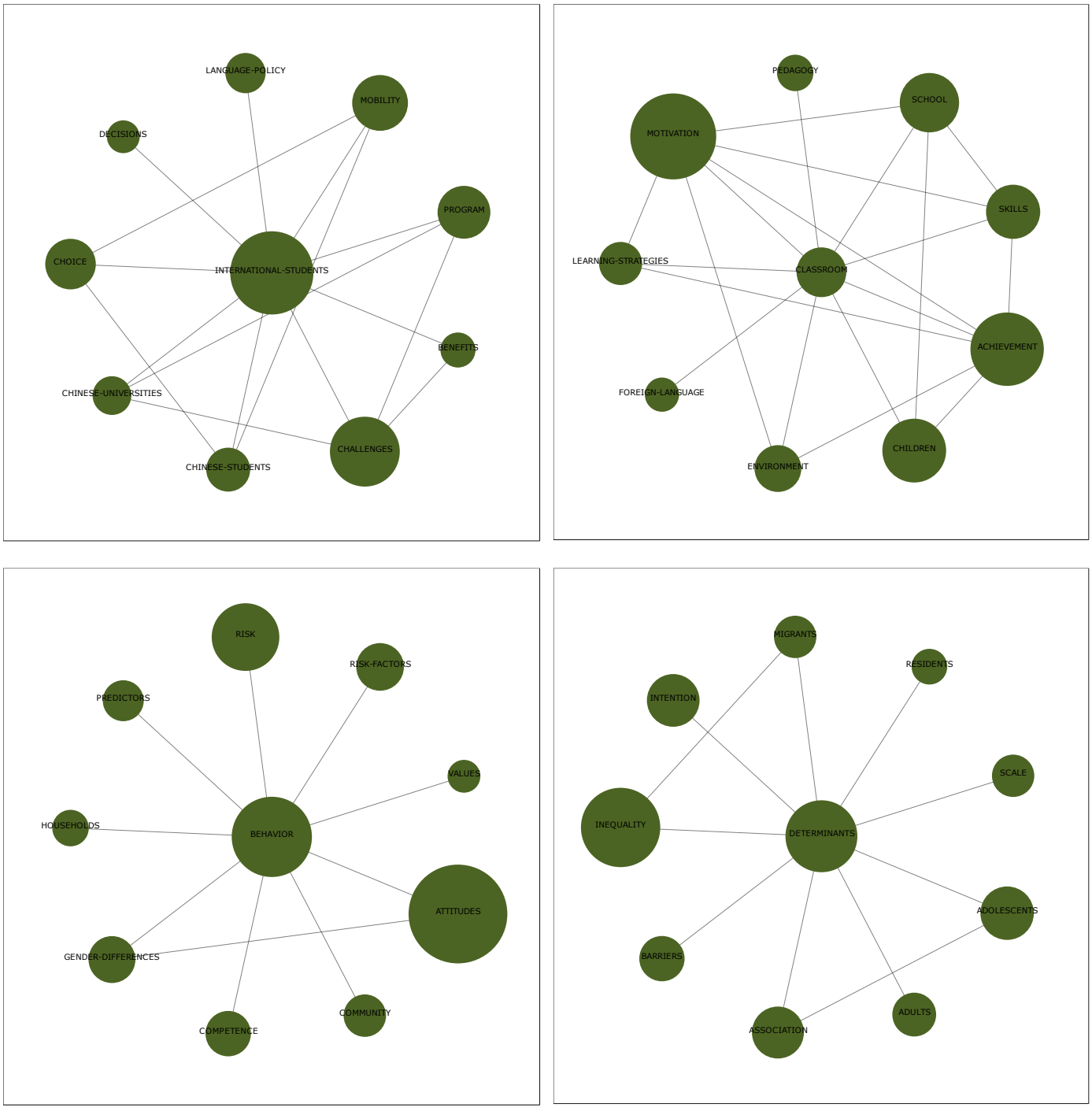


Figure B1. 2015–2019 cluster networks.

Appendix C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CHOICE
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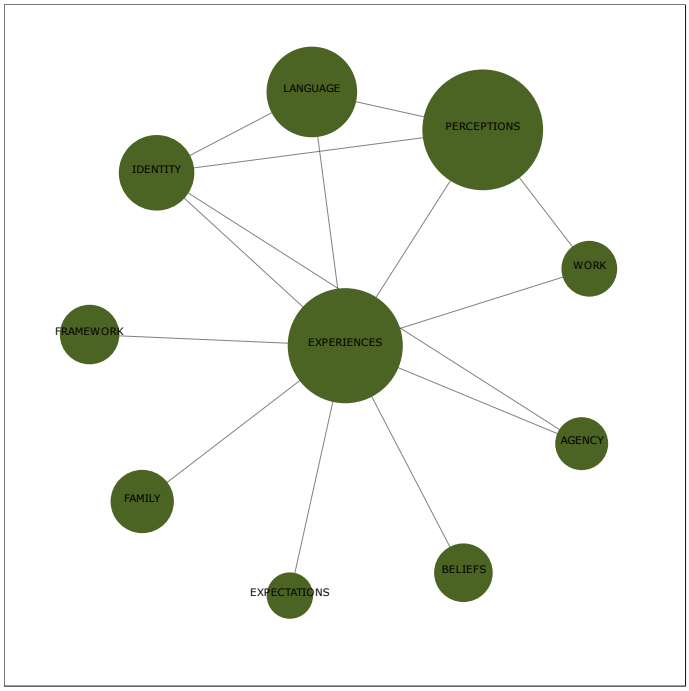
BENEFITS
CHINESE-UNIVERSITIES
CHALLENGES
CHINESE-STUDENTS
PEDAGOGY
SCHOOL
MOTIVATION
SKILLS
LEARNING-STRATEGIES
CLASSROOM
ACHIEVEMENT
FOREIGN-LANGUAGE
CHILDREN
ENVIRONMENT
RISK
RISK-FACTORS
PREDICTORS
VALUES
HOUSEHOLDS
BEHAVIOR
ATTITUDES
GENDER-DIFFERENCES
COMMUNITY
COMPETENCE
MIGRANTS
RESIDENTS
INTENTION
SCALE
INEQUALITY
DETERMINANTS
ADOLESCENTS
BARRIERS
ADULTS
ASSOCIATION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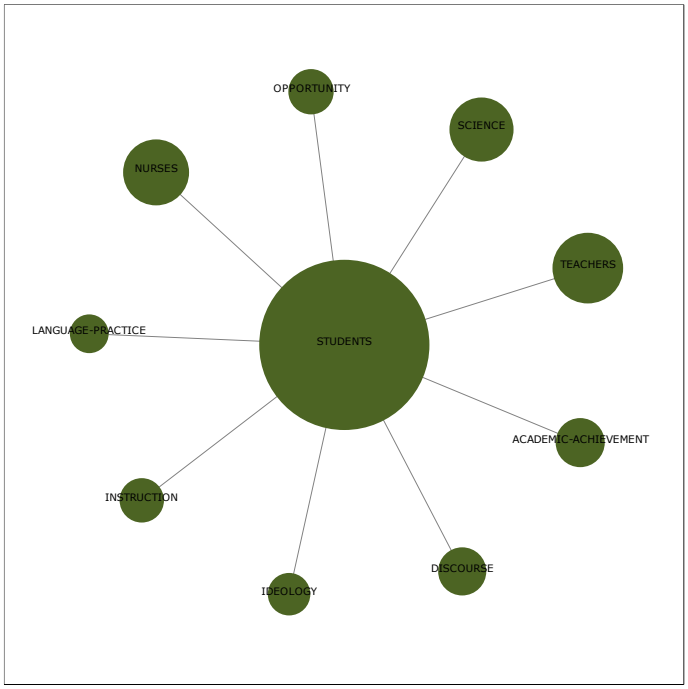
PERCEPTIONS
IDENTITY
WORK
FRAMEWORK
EXPERIENCES
AGENCY
FAMILY
BELIEFS
EXPECTATIONS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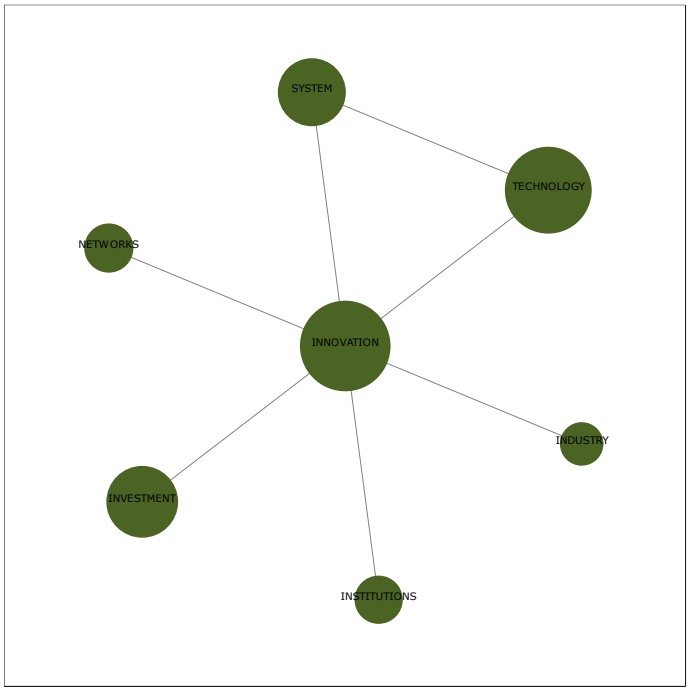
TEACHERS
LANGUAGE-PRACTICE
STUDENTS
ACADEMIC-ACHIEVEMENT
INSTRUCTION
DISCOURSE
IDEOLOGY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NETWORKS
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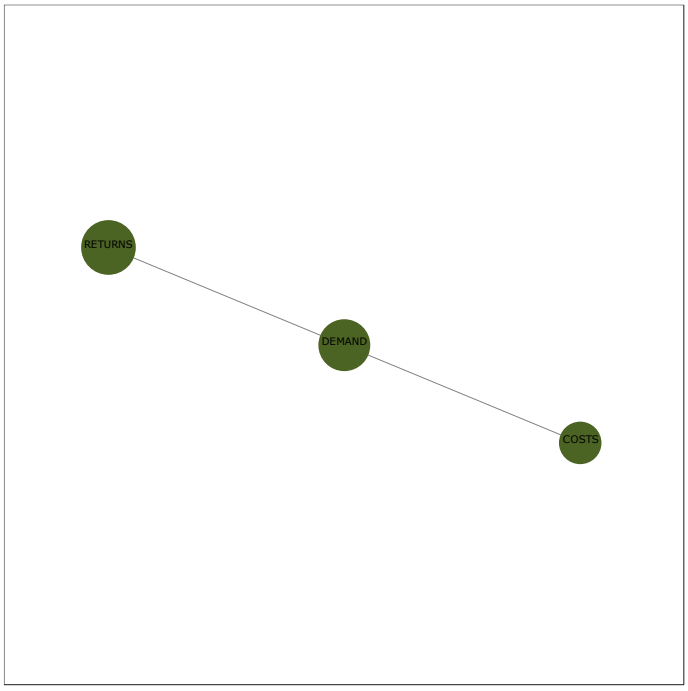
INVESTMENT
INSTITUTIONS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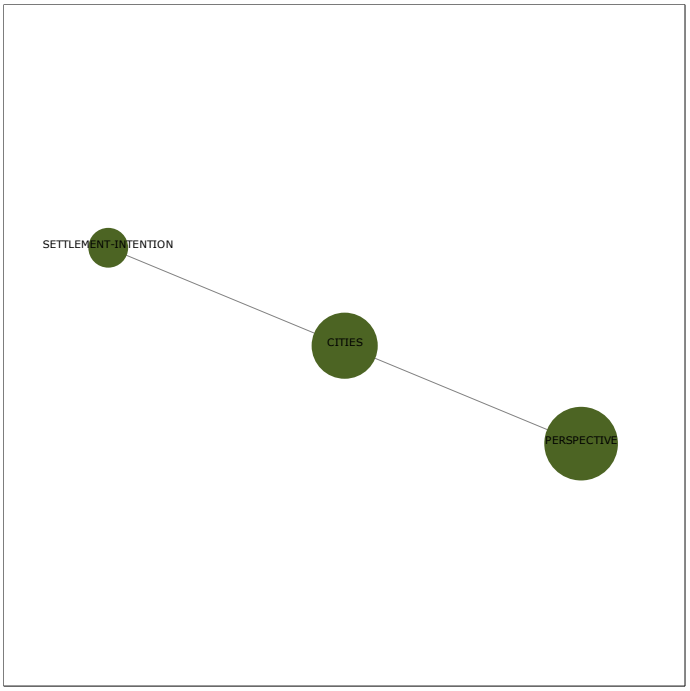

Figure C1. 2020–2024 cluster networks.