

International Students in China During COVID-19: A Bibliometric Analysis

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Abstract

The COVID-19 pandemic has significantly impacted higher education worldwide, reshaping the experiences of international students, particularly in China. This study addresses the pressing need to understand the multi-dimensional challenges faced by these students, such as mental health concerns, cultural adaptation struggles, and the rapid shift to online learning, all of which have intensified under pandemic conditions. Utilizing bibliometric analysis, this research examines 150 articles from the Web of Science database (2019–2024) using CiteSpace, aiming to reveal key trends and developmental trajectories in studies on international students in China amid COVID-19. Our analysis reveals 13 principal clusters, encompassing student mobility, online learning, cultural adaptation, and mental health, demonstrating an evolution in research focus from immediate pandemic responses to broader considerations of student experiences. Key findings indicate that studies have shifted over time to focus more on the socio-cultural and psychological aspects of adaptation, as well as the impact of digital learning environments on students' academic engagement and satisfaction. Additionally, certain clusters underscore the interdisciplinary nature of this research field, as journals across education, psychology, and intercultural studies exhibit strong connections. Future research should delve deeper into specific adaptation mechanisms and policy support frameworks to improve the experiences of international students. This study contributes essential insights for educational institutions and policymakers in formulating strategies that promote the well-being and success of international students, especially in crisis contexts.

Keywords: International Students, International Students in China, COVID-19 Pandemic, Knowledge Mapping

Introduction

The COVID-19 pandemic has changed the higher education landscape worldwide, with ripple effects in the educational sector. As Wu et al (2021), highlighted, international students have significant mental health issues because of the pandemic, and many of them also reported solitary loneliness and a lack of social support compared to their domestic peers (Wu &

Munthali, 2021). Further, Roy et al (2022), locate that such consumption of social media and news added to increased anxiety and fear in the students, complicating their mental health status (Roy Bhattacharjee et al., 2022). The educational experience has also seen remarkable changes during the pandemic, especially with the shift to online learning for international students. The educational experience has also seen remarkable changes during the pandemic, especially with the shift to online learning for international students. Zhang et al. (2023), also noted that while a small percentage of overseas students expressed satisfaction with online education, the majority had trouble staying motivated and engaged (Zhang et al., 2023). This is in accordance with the findings of Tian and Lu (2022), who discovered that elements including the depth of quality in online instruction and the degree of teacher engagement influenced how satisfied overseas students were (Tian & Lu, 2022). The pandemic has also had a substantial impact on international student mobility and enrollment in Chinese higher education. Shijian and Agyemang in 2022 showed that the pandemic drove away prospects, and hence this trend has impacted students' choices to study in China, despite the provision of scholarships and other forms of incentives (Shijian & Agyemang, 2022). This trend has called into question the future of the internationalization of Chinese higher education. Research on international students in China about the impacts of COVID-19 stands important for a deep idea of multi-dimensional challenges they face.

Bibliometrics is an effective method frequently used in research to analyze and describe research trends (Gingras, 2016; Passas, 2024; Zhou et al., 2022). Such analyses help researchers gain a comprehensive understanding of the current state of a discipline and its evolving research patterns (Aristovnik et al., 2020; Jia & Mustafa, 2022). They also assist in identifying future research areas and key issues. Currently, bibliometric studies on international students in China in relation to COVID-19 are still lacking. This paper aims to systematically evaluate the current state, key focus areas, and emerging trends of research on international students in China since the outbreak of COVID-19. To this end, we use CiteSpace to conduct a visual analysis of 150 articles on the topic of "international students in China and COVID-19" published between 2019 and September 2024 in the Web of Science (WoS). Our analysis identifies key findings and offers insights for future research directions.

The subsequent sections of this work are structured as follows: Section 2 delineates the research methodologies and data sources; Section 3 presents the findings of the knowledge mapping analysis; and Section 4 encapsulates the principal themes of the knowledge mapping analysis.

Method

The authors of this study performed visualization analysis using bibliometric techniques. In recent years, CiteSpace, a visualization tool, has been used widely in academia both domestically and abroad. CiteSpace facilitates the examination of research hotspots and trends in the literature by creating visual knowledge maps of keywords, authors, and organizations (Yi Cui et al., Jiming Xie et al., Xiaoyu Qu et al.). It also helps scholars grasp the most recent advancements in a certain research subject by revealing the evolutionary paths and new development patterns in that field (Yi Cui et al., Xue Ding et al., Shuanjun An et al.). CiteSpace is extensively utilized for the analysis of research across several domains, encompassing both the social and natural sciences. (Ge et al. 2022; Li et al. 2022b; Li and Luo 2021; Ma et al. 2022). Following Chen's (2006) recommendations, this paper applies

methods such as publication trends, co-occurrence analysis, and data clustering analysis to examine international students in China and COVID-19. Researchers can identify the current state and trends of research from this analysis.

*Data sources:*The terms "international students in China" and "COVID-19" serve as guiding principles throughout the study. The search query TOPIC= "COVID-19" AND topic "international student*" OR "foreign student*" OR "overseas student*" OR "cross-border student*" OR "global student*" OR "non-domestic student*" OR "student* abroad" OR "international scholar*" OR "foreign scholar*" OR "overseas scholar*" OR "international learner*" AND "China" was used to search for English publications in the WoS (Web of Science) database. As shown in Fig. 1 total of 150 results were obtained.was used to search for English publications in the WoS (Web of Science) database

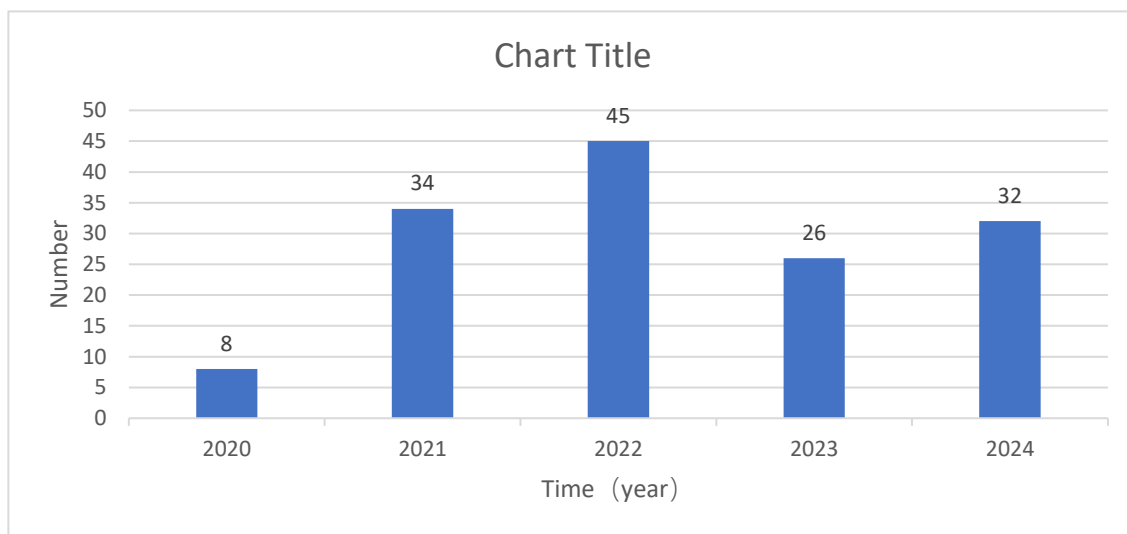


Fig. 1 WoS search results and citations from 2020 to 2024

Results

Journal co-citation analysis: This section presents an analysis of journal co-citations from various publications. It provides a compilation of the most prominent and current publications concerning COVID-19 and international student research in China. This clarifies the specific areas of present investigation, offers criteria for assessing future research prospects, and assists in identifying potential research opportunities. This objective can be achieved by presenting a summary of the existing study domains. It assists researchers in selecting appropriate publications for disseminating their study findings.

CiteSpace v. 5.2.R1 (64-bit)
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 Selection Criteria: g-index (p=0.1), LRF=1.0, LBY=10, LBW=5, e=1.0
 Network: N=282, E=1150 (Density=0.0364)
 Largest CC: 248 (88%)
 Nodes Labeled: 1.0%
 Pruning: None

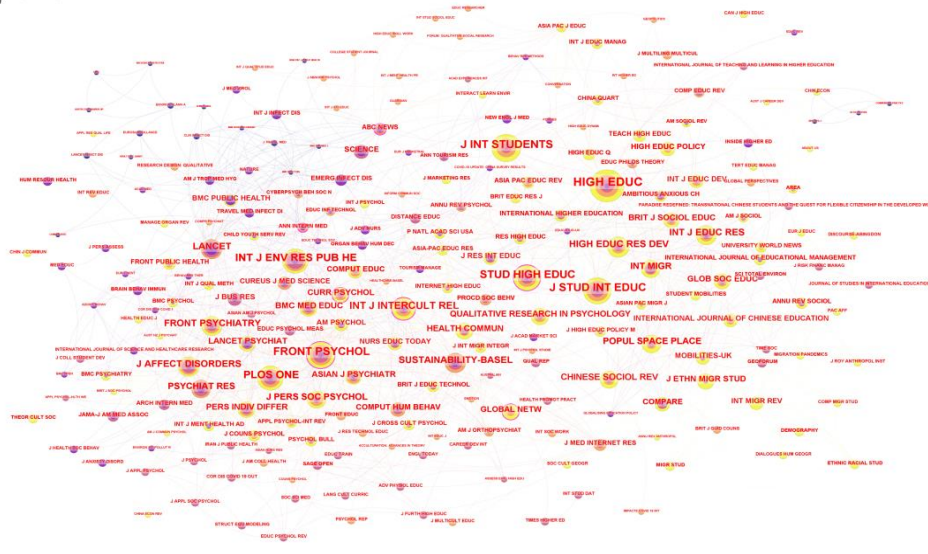


Fig. 2 Journal co-citation network

Table 1
 Top 10 Journals by Citation

TOP10 by citation	Total citation	Centrality	Year
HIGH EDUC	57	0.09	2021
J INT STUDENTS	42	0.04	2021
FRONT PSYCHOL	39	0.13	2021
J STUD INT EDUC	39	0.1	2021
STUD HIGH EDUC	37	0.1	2021
INT J ENV RES PUB HE	34	0.03	2021
PLOS ONE	33	0.1	2021
INT J INTERCULT REL	28	0.13	2021
HIGH EDUC RES DEV	24	0.05	2021
LANCET	22	0.08	2020

Fig. 2 show the journal co-citation network, as shown in Table 1, all journals are indexed by SCI. The top 10 journals publishing the most articles in the field of education are Higher Education, Journal of International Students, Frontiers in Psychology, Journal of Studies in International Education, Studies in Higher Education, International Journal of Environmental Research and Public Health, PLOS ONE, The Journal of Intercultural Relations, Higher Education Research & Development, and Journal of Affective Disorders. Comparing the frequency rankings with high centrality measures revealed some noteworthy patterns. Although Higher Education has the highest publication frequency (57), its centrality (0.09) is not the highest. Frontiers in Psychology and The Journal of Intercultural Relations share the highest centrality measure (0.13), suggesting they play a more pivotal role in connecting different research directions in this field.

Journal cluster analysis: The clustering pattern of the journal co-citation network is displayed in Fig. 3. The graphic displays the journal co-citation network's clustering, which is made up of ten clusters. Table 3 lists the ten most significant clusters. 54 individuals make to the biggest cluster (Cluster 0), which has a silhouette value of 0.754. This cluster mainly involves the fields of psychiatry, multidisciplinary psychology, and educational research. The second largest cluster (Cluster 1) has 49 members with a silhouette value of 0.633, focusing primarily on health policy and services, as well as healthcare science. Cluster 2 is the third largest, with a silhouette value of 0.870 and 47 members, concentrating on education and educational research, public environment, and occupational health. Notably, the silhouette values of most clusters exceed 0.8, indicating a high degree of reliability in the clustering results. Specifically, the silhouette values of Clusters 3, 4, and 5 are 0.829, 0.891, and 0.840, respectively, indicating a high level of thematic consistency within these clusters.

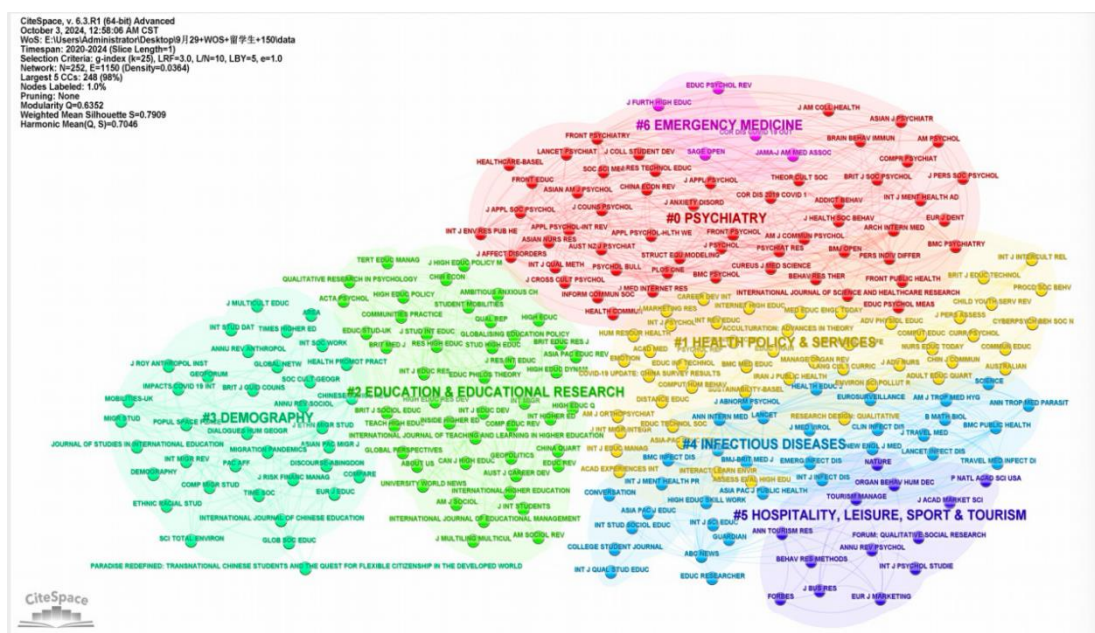


Fig. 3 Journal co-citation network cluster

Table 3
Summary of the Largest 10 Clusters

Cluster ID	Size	Silhouette	Label (LLR)	Label (MI)	Average Year
0	54	0.7	PSYCHIATRY (10.33, 0.005)	MULTIDISCIPLINARY SCIENCES (0.51)	2021
1	49	0.6	HEALTH POLICY & SERVICES (6, 0.05)	INDUSTRIAL RELATIONS & LABOR (0.58)	2021
2	47	0.8	EDUCATIONAL RESEARCH (35.7, 1.0E-4)	POLITICAL SCIENCE (0.48)	2021
3	37	0.8	DEMOGRAPHY (16.24, 1.0E-4)	TRANSPORTATION (0.34)	2022

4	3	0.8	INFECTIOUS DISEASES	MEDICINE, GENERAL & INTERNAL (0.32)	2021
	3	91	(8.1, 0.005)		
5	1	0.8	HOSPITALITY, LEISURE,	INDUSTRIAL RELATIONS & LABOR (0.09)	2021
	3	4	SPORT & TOURISM		
			(11.49, 0.001)		
6	5	0.9	EMERGENCY MEDICINE	EDUCATION & EDUCATIONAL	2021
		17	(7.64, 0.01)	RESEARCH (0.13)	
7	4	0.9	GEOGRAPHY (7.65, 0.01)	EDUCATION & EDUCATIONAL	2020
		93		RESEARCH (0.17)	
8	2	1	COMPUTER SCIENCE,	EDUCATION & EDUCATIONAL	2020
			ARTIFICIAL INTELLIGENCE	RESEARCH (0.17)	
			(12.14, 0.001)		
9	2	1	education & educational	EDUCATION & EDUCATIONAL	2020
			research	RESEARCH (3.44, 0.1); PSYCHOLOGY,	
				MULTIDISCIPLINARY (0.21, 1.0)	

The temporal distribution of research topics shows that after 2020, publications concentrated in multiple fields, including demography, geography, epidemiology, and medical research and experiments. Additionally, emerging topics such as sustainability science, environmental studies, and the application of artificial intelligence in education have also started gaining attention. Notably, Cluster 5 reflects the trend of cross-disciplinary integration between hospitality, leisure, sports, and tourism studies with sustainability science and environmental research. This reflects the interdisciplinary and diversified development trends in the field of international student research within the context of the COVID-19 pandemic.

Table 4
Top 10 Ranked Journal by Degree

Degree	References	Cluster ID	Field
40	PLOS ONE	0	Multidisciplinary
38	J AFFECT DISORDERS	0	Psychiatry
37	FRONT PSYCHOL	0	Psychology
35	ANN INTERN MED	4	Internal Medicine
33	CURR PSYCHOL	1	Psychology
32	PERS INDIV DIFFER	0	Psychology
30	INT J INTERCULT REL	1	Cultural Studies
30	FRONT PSYCHIATRY	0	Psychiatry
29	LANCET	4	Medicine
2	J STUD INT EDUC	2	Education

Journal degree analysis: The ten most distinguished publications are arranged by degree in Table 4. With a degree of 40, PLOS ONE in Cluster 0 is the highest-ranked journal according to the degree analysis. J AFFECT DISORDERS is another entity in Cluster 0, with a rating of 38. Third place goes to FRONT PSYCHOL, a Cluster 0 student with a grade of 37. Fourth place goes to ANN INTERN MED, a Cluster 4 member with a grade of 35. With a rating of 33, CURR

PSYCHOL is ranked seventh by Cluster 1. With a grade of 32 and belonging to Cluster 0, PERS INDIV DIFFER is tied for sixth place with INT J INTERCULT REL from Cluster 1. With a degree of 30, Cluster 0 member FRONT PSYCHIATRY and Cluster 4 member LANCET share the eighth spot. Tenth place is held by J STUD INT EDUC, a Cluster 2 member with a grade of 29. As a result of the multidisciplinary character of the study on foreign students conducted during the COVID-19 epidemic, these publications include a wide range of topics in addition to the popular area of research on international students, including psychology, medicine, psychiatry, and intercultural interactions.

Table 5
Top 10 ranked journal by centrality

Centrality	References	Cluster ID	Field
0.13	FRONT PSYCHOL	0	Psychology
0.13	INT J INTERCULT REL	1	Intercultural Relations
0.12	ABC NEWS	4	News Media
0.11	ANN INTERN MED	4	Medicine
0.11	CURR PSYCHOL	1	Psychology
0.11	GLOBAL NETW	3	Global Studies
0.1	PLOS ONE	0	Multidisciplinary Sciences
0.1	J STUD INT EDUC	2	International Education
0.1	STUD HIGH EDUC	2	Higher Education
0.09	HIGH EDUC	2	Higher Education

Journal centrality analysis: Table 5 shows the top 10 journals ranked by centrality. The highest centrality in Cluster 0 is Frontiers in Psychology, with a centrality score of 0.13. International Journal of Intercultural Relations from Cluster 1 ties for first place, also with a centrality score of 0.13. The third journal in Cluster 4 is ABC News, with a centrality score of 0.12, followed by Annals of Internal Medicine in fourth place with a score of 0.11. Current Psychology from Cluster 1 and Global Networks from Cluster 3 tie for fifth place, each with a centrality score of 0.11. PLOS ONE from Cluster 0, Journal of Studies in International Education, and Studies in Higher Education from Cluster 2 tie for seventh place, all with a centrality score of 0.10. In tenth place is Higher Education from Cluster 2, with a centrality score of 0.09. Notably, journals in the fields of psychology and intercultural studies hold high centrality rankings, indicating that these fields play significant roles in current research. Additionally, journals from the fields of news media and medicine also rank highly, reflecting the interdisciplinary nature of this research. It is also worth noting that journals related to higher education and international education are represented in the rankings, indicating the significance of these fields in the research.

Overall, researchers have identified that the knowledge structure of studies on international students in China and COVID-19 has a broad scope. The main research areas include mental health, cross-cultural adaptation, educational policy, and epidemiology, which are among the most popular research directions in this field. In contrast, the impact of COVID-19 on the mental health and adaptability of international students represents an emerging research topic. Research on digital learning, distance

Keyword :This section of the co-occurrence of keywords in 150 articles is done in this section. The analysis of keyword co-occurrence highlights areas of interest and current developments in the fields of COVID-19 and foreign students in China.The main analysis focuses on keyword clustering and burst detection to identify these research frontiers and trends.

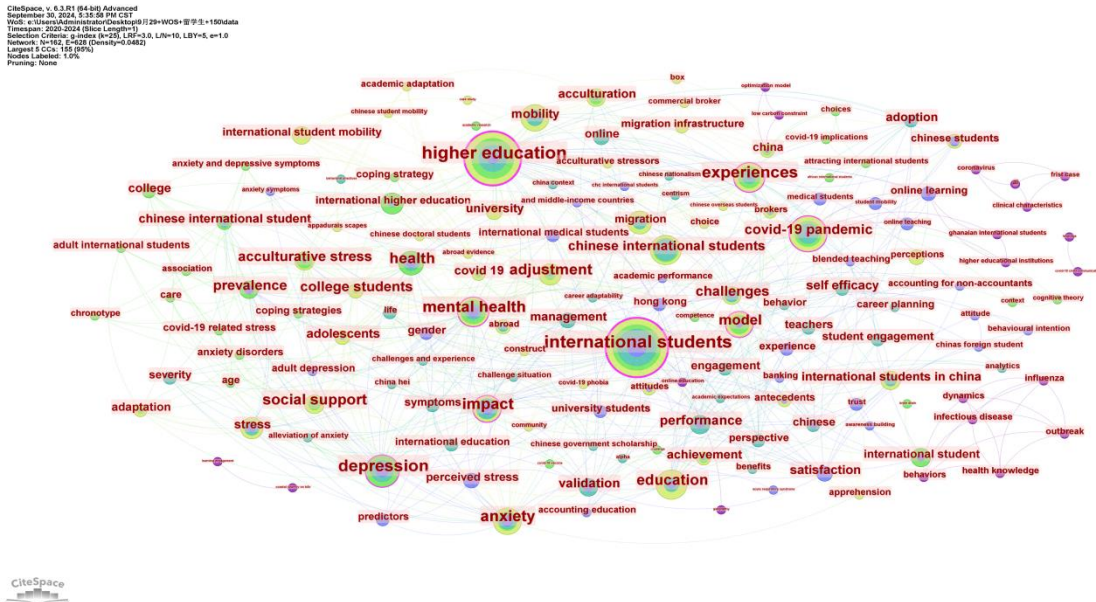


Fig. 4 Keyword co-occurrence network

Table 6

Top 10 keywords co-occurrence

citation counts	keyword	citation counts	keyword
45	international students	12	mental health
36	higher education	12	education
16	covid-19 pandemic	11	chinese international students
13	depression	10	anxiety
12	experiences	10	mobility

A Keyword Co-occurrence Analysis:In this section, the researchers analyzed keyword co-occurrence. The keyword co-occurrence network is shown in the figure.4. Table 6 presents the top 10 most frequent co-occurring keywords: "international students," "higher education," "COVID-19 pandemic," "depression," "experiences," "mental health," "education," "Chinese international students," "anxiety," and "mobility."

CiteSpace v. 5.8.R1 (64-bit) Advanced
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 Timespan: 2025-2024 (Slice Length=1)
 Selection Criteria: q=0.95 (k=10, L=10, M=10, LBV=0, e=1.0)
 Network: N=192, E=759 (Density=0.0416)
 Largest CC: 183 (95%)
 Nodes Labeled: 1.0%
 Pruning: None
 Modularity Q=0.8322
 Weighted Mean Silhouette S=0.8778
 Harmonic Mean(Q,S)=0.7211

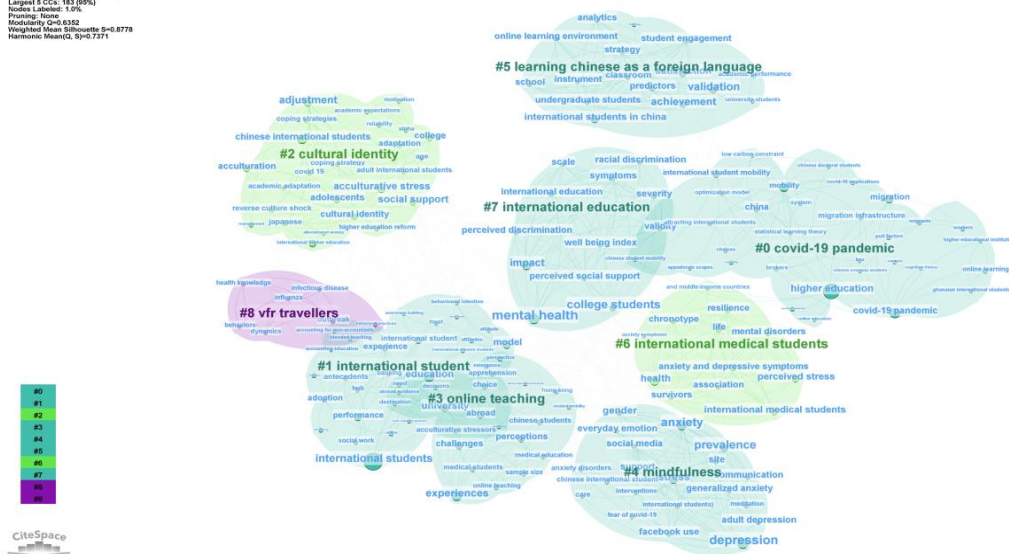


Fig. 5 Keyword Clustering Analysis

Table 7 Summary of the 13 Keyword Co-Occurrence Clusters						
Cluster ID	S	Sil	Label (Keywords)	Label (LLR)	Label (MI)	Y
0	3	0.9136	covid-19 pandemic; international student mobility	covid-19 pandemic (16.2, 1.0E-4); international student mobility (9.67, 0.005)	health-misinformation seeking (0.74)	2
1	2	0.809	international students; student engagement; online learning environment	international student (8.69, 0.005); social work (5.78, 0.05)	brokerage (0.91)	2
2	2	0.7568	international students; academic adaptation; cultural identity	cultural identity (13.85, 0.001); academic expectations (9.24, 0.005)	intercultural sensitivity (0.3)	2
3	2	0.811	international students; medical education; online teaching	online teaching (9.16, 0.005); medical students (9.16, 0.005)	program choice (0.31)	2
4	2	0.9019	mindfulness; covid-19; international students; fear of covid-19	mindfulness (10.03, 0.005); fear of covid-19 (10.03, 0.005)	covid-19 related stress (0.23)	2
5	1	0.947	student engagement; learning chinese; online learning environment	learning chinese as a foreign language (11.44, 0.001);	english language	2

			student engagement (10.76, 0.005)	learners (0.15)	2
			international medical students (23.51, 1.0E-4);	anxiety symptoms (0.14)	1
6	2	77	symptoms; mental health		2
			mental health; chinese international students;	international education (9.33, 0.005); perceived social issues (0.29)	0
7	2	24	international education		2
			travel medicine; china; australia; vfr travellers	vfr travellers (8.21, 0.005); covid-19 (0.05)	2
8	7	21			0
			clinical characteristics; covid-19; epidemiology	epidemiology (9.74, 0.005); clinical characteristics (9.74, 0.005)	0
9	4	1	tpb; learning engagement; study abroad through chinese program	professional commitment (8.83, 0.005); study abroad through chinese program (8.83, 0.005)	2
10	4	1		covid-19 (0.06)	0
			international students; university city; education policy	university city (9.74, 0.005); covid-19 (0.07)	2
11	2	1	multilingualism; china's belt and road initiative;	education policy (9.74, 0.005)	1
			covid-19 crisis	china's belt and road initiative (9.74, 0.005); english as a covid-19 (0.07)	2
12	2	1	communication	global language (9.74, 0.005)	0

Keyword Clustering Analysis: In this study, Fig. 5 shows the keyword clustering.

13 clusters were identified through keyword co-occurrence analysis. The table 7 provides detailed information on all 13 clusters. These 13 most significant clusters are listed in the table 7. The largest cluster (Cluster 0) contains 31 articles, with a silhouette score of 0.936. This cluster mainly focuses on the impact of the COVID-19 pandemic on international student mobility, as well as international student education in the context of China's Double First-Class University initiative. The second-largest cluster (Cluster 1) contains 27 articles, with a silhouette score of 0.809. This cluster focuses on topics such as international student engagement, online learning environments, and social distancing behaviors. The third-largest cluster is Cluster 2, with a silhouette score of 0.768 and 25 articles. This cluster primarily studies issues related to international students' cultural identity, academic adaptation, and mental health.

Notably, most clusters have silhouette scores above 0.8, indicating a high level of reliability and validity in the clustering results. Specifically, the silhouette scores of Clusters 0, 4, and 5 are 0.936, 0.919, and 0.947, respectively, indicating a high degree of thematic consistency

within these clusters. Clusters 9, 10, 11, and 12 are quite small (containing 4 or 2 items), which is why they received a silhouette score of 1.

Through keyword co-occurrence analysis, we can identify the main research frontiers in the study of international students in China, which focus on the following aspects: 1, The impact of the COVID-19 pandemic on international students in China (Clusters 0, 4, 9) 2, Online learning environments and student engagement (Clusters 1, 5). 3, Cultural adaptation and mental health (Clusters 2, 6, 7) 4, China-specific international education policies and programs (Clusters 0, 10, 12)

Top 7

Keywords with the Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	2014 - 2024
online learning	2020	1.2	2020	2021	
life	2022	0.81	2022	2024	
college	2022	0.81	2022	2024	
performance	2021	0.8	2021	2022	
chinese international student	2022	0.6	2022	2024	
predictors	2021	0.53	2021	2022	
adoption	2021	0.26	2021	2022	

Keyword Burst Analysis

1. Emergency Response in the Early Stage of the Pandemic

In 2020, the keyword "online learning" experienced a significant burst in citations (intensity 1.2), directly reflecting the rapid shift of higher education institutions to remote learning during the early stage of the pandemic. This had a major impact on international students in China, as they had to adapt to new learning methods, with some being unable to return to their home countries or re-enter China due to border control measures.

2. Ongoing Impact Assessment

The surge in citations of the keywords "performance" and "predictors" in 2021 indicates that researchers have begun to focus on the long-term impact of the pandemic on the academic outcomes of international students in China and on which factors can predict student success in this unique context.

3. Cultural Adaptation and Mental Health

The keywords "life" and "college" saw a citation surge beginning in 2022, with an intensity of 0.81, and are expected to continue through 2024. This likely reflects the ongoing interest of researchers in the overall life and college experiences of international students in China during the pandemic, including their mental health and the impact of social isolation.

4. Specific Group Studies

The keyword "Chinese international student" saw a citation surge starting in 2022, with an intensity of 0.6, and is expected to continue through 2024. This trend may reflect several factors:

As one of the first countries to control the pandemic, China's policies and management of international students may have become a research focus.

The impact of China's "Zero-COVID" policy on international students, including entry restrictions and quarantine policies.

5. Adoption of New Technologies and Methods

The surge in citations of the keyword "adoption" in 2021 may be related to the rapid implementation of new technologies and teaching methods during the pandemic. This likely includes the use of new technologies such as virtual labs and online collaboration tools in the education of international students

By use of keyword co-occurrence analysis of COVID-19 and studies on international students in China, researchers were able to discern three distinct stages of development (early, mid, and post-pandemic) and linked research areas. Furthermore, a number of important subjects in this discipline have attracted a lot of scholarly attention. These frontiers explore the complexities of cultural adaptation and mental health issues, alongside the academic and life adaptation of international students during the pandemic. The pandemic's profound impact on educational technologies and teaching methods has also led to a significant focus on the rapid development of online education and remote learning models. Furthermore, research on intercultural communication and policy support for international students in China has gained increasing relevance, suggesting that the field is not only concerned with individual adaptation but also with how educational policies shape support systems for these students. These multifaceted research frontiers highlight the intricate and dynamic nature of studies on international students in China during COVID-19, expanding beyond individual experiences to encompass mental health, educational technology, and policy dimensions.

Conclusion

This study focuses on the current state and developmental trends of research on international students in China within the context of the COVID-19 pandemic, employing bibliometric methods for systematic analysis. The research background stems from the significant changes in the global higher education landscape, particularly the unique challenges faced by international students during the pandemic, including mental health issues, cultural adaptation difficulties, and sudden shifts in learning modes.

Methodologically, this paper utilizes CiteSpace to conduct a visual analysis of 150 relevant articles published in the Web of Science database from 2019 to September 2024. Through publication trend analysis, co-occurrence analysis, and data clustering analysis, the study reveals the knowledge structure, research hotspots, and emerging trends in this field.

Key research findings include: (1) Journal co-citation analysis shows that journals in education, psychology, and intercultural studies dominate this research area, reflecting the interdisciplinary nature of the research. (2) Keyword co-occurrence analysis reveals 13 main research clusters, covering topics such as student mobility, online learning environments, cultural adaptation, and mental health. (3) Research frontiers primarily focus on the multifaceted impact of COVID-19 on international students, including learning experiences, mental health status, and cultural adaptation processes. Research trends show distinct phases: the early stage (2020), mainly focused on the emergency transition to online learning;

the middle stage (2021), began to assess the long-term impact of the pandemic, including student academic performance and predictive factors; the later stage (from 2022 onwards) has paid more attention to international students' overall life experiences, cultural adaptation, and mental health issues. Additionally, there has been a significant increase in research interest in policies and management of international students in China, reflecting an expansion of research perspectives in this field. The significance of this study lies in: (1) Comprehensively reviewing the complexity and dynamics of research on international students in China in the context of COVID-19, providing direction for future research. (2) Revealing the multidimensional challenges faced by international students in global crises, including learning adaptation, mental health, and cultural integration. (3) Providing valuable references for higher education institutions and policymakers to improve international students' learning and living experiences. (4) Offering valuable insights for international education management in potential future global crises.

In summary, this study not only reflects the profound impact of COVID-19 on international students in China but also highlights the adaptability and resilience of international higher education in the face of global challenges. These findings have important theoretical and practical implications for promoting the sustainable development of international education and enhancing the level of educational internationalization.

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