



International Journal of Education and Teaching

Publisher's Home Page: <https://www.svedbergopen.com/>



Research Paper

Open Access

Utilizing Baidu Index to Investigate the Public Concern Towards Vocational Education in the Chinese Mainland

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Article Info

Volume 4, Issue 2, December 2024

Received : 04 November 2024

Accepted : 21 December 2024

Published : 31 December 2024

doi: [10.51483/IJEDT.4.2.2024.39-51](https://doi.org/10.51483/IJEDT.4.2.2024.39-51)

Abstract

Background and purpose: According to the 54th Statistical Report on China's Internet **Background and purpose:** As of June 2024, China has nearly 1.1 billion netizens with a 78% penetration rate. Search engines, with 824 million users, are a crucial information-seeking channel, and Baidu leads the market. **Materials and methods:** This study used the Baidu Index database to analyze public attention to "vocational education" from 2014 - 2024. It explored trend research, demand graphs, and user portraits, and also compared with related terms like "vocational training". **Results:** The search trend for "vocational education" showed an upward trend with five fluctuations. The public's top concerns were "Craftsman spirit" and "Engineer". High-attention groups were mainly in East China, with similar male - female attention and an age focus on 20 - 39 years old. The search trends of "vocational education" and "vocational training" were alike, and their attention groups were both mainly in East China. **Conclusion:** Baidu Index is a vital tool for tracking keyword search trends. The rising public attention to vocational education is due to national policies. The public shows more interest in related terms like "vocational secondary education" and "vocational training".

Keywords: *RVocational Education, Search Engine, Baidu index, Vocational Secondary Education, Vocational Education and Training*

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1. Introduction

The idea of vocational education originated from the 16th century, Ma and Chen (2016) and was born with the development of industrialization, production socialization and modernization, and it has become an indispensable part of modern education. In a sense, vocational education is employment education. Some countries have taken the development of vocational education system as an important education development strategy (Chen and Chen, 2024). The government makes efforts continuously to enhance the attractiveness of vocational education, enhance the professional ability of practitioners, and promote national economic development and social employment. In the 1860s, China founded the first

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modern vocational school-Fuzhou Mawei Ship Administration School (Liu and Yu, 2016). So far, China's vocational education has been exploring and developing for more than 150 years. In recent years, Chinese government has proposed to "accelerate the construction of a modern vocational education system, Train more high-quality technical talents to be skilled craftsmen"(Xinhua News Agency, 2021), "deepen the reform of education mode, education mode, management system and security mechanism, develop vocational undergraduate education steadily, build a number of high-level vocational colleges and majors", "promote the integration of vocational education and general education, enhance the adaptability of vocational education", and the status of vocational education has become increasingly prominent. The Chinese government has put forward the stage of high-quality development, modern manufacturing, emerging industries and other fields need a large number of high-quality skilled talents, promote the integration of vocational integration, production and education, science and education, optimize the type of vocational education positioning (Zhan, 2023). The "Opinions on Deepening the Reform of the Construction of the Modern Vocational Education System" further emphasizes that it is necessary to fully mobilize the enthusiasm of all parties, promote the construction and reform of the modern vocational education system in an orderly and effective manner, effectively improve the quality, adaptability and attractiveness of vocational education, cultivate more high-quality technical talents, and lay a solid foundation for the construction of a strong country (General Office of the CPC Central Committee, 2022).

Vocational education is extremely important for individuals, society and the country. In the final analysis, vocational education is implemented in the individual development, through vocational education, individuals can acquire vocational skills and knowledge, enhance vocational competitiveness, and lay the foundation for the long-term development of career (Xu and Hao, 2023). Vocational education can cultivate talents who meet the needs of the market. To meet the needs of social development and promote social harmony and stability (Xie and He, 2021). High-quality technical personnel can provide a strong talent guarantee for the country's economic development, so as to promote industrial upgrading and innovation, and improve the country's economic competitiveness. To sum up, vocational education is not only related to the construction of a powerful country in education, but also has a profound impact on the development of individuals, and has been widely concerned by the country, society and people.

Since the beginning of the 21st century, with the rapid development of the Internet, information technology has been fully integrated into all fields and the whole process of economic, political, cultural, social and ecological civilization construction, promoting the formation of new ideas, new forms of business and new models, triggering changes in the way of production, life, organization and the way of thinking, and the development of human society into a digital society. Big data has been applied to various fields and has become an effective statistical analysis tool (Xu and Wang, 2018). When users use search engines, they will leave search traces, which will generate a series of network data. Baidu Engine is the most widely used search engine by the Chinese public, and its Baidu Index provides a basis for understanding the public's concern about vocational education. There are abundant research results on the combination of Baidu Index and various fields. Scholars have used the index to study tourism (Tan *et al.*, 2021), epidemics (Zheng and Zhai, 2021) and investment (Song, 2019), but few studies have applied the index to the field of "vocational education."

2. Materials and Methods

According to the Stat counter website, the search engine with the largest global market share between January 2014 and November 2024 is Google (Figure 1). In China, Baidu is the world's largest Chinese-language search engine (Figure 2), combining search functions and intelligent information recommendation to provide service platforms such as Baidu Index, Baidu Statistics and Baidu Cloud Observation. Baidu launched Baidu Index, a data sharing platform based on Baidu's massive Internet user behavior data. Since its launch in 2006, Baidu Index is based on more than 6 billion search requests every day. Baidu Index has gradually become the most authoritative indicator of open Internet big data, which mainly includes two Internet access interfaces on PC and mobile. The three content sections of "Trend research", "Demand graph" and "User portrait".

This study uses Baidu Index as the data source and "vocational education" as the search keyword to explore the public's social attention to vocational education. Based on the period from January 1, 2014 to November 1, 2024, this study summarizes the online search trend data of "vocational education" in China over the past ten years.

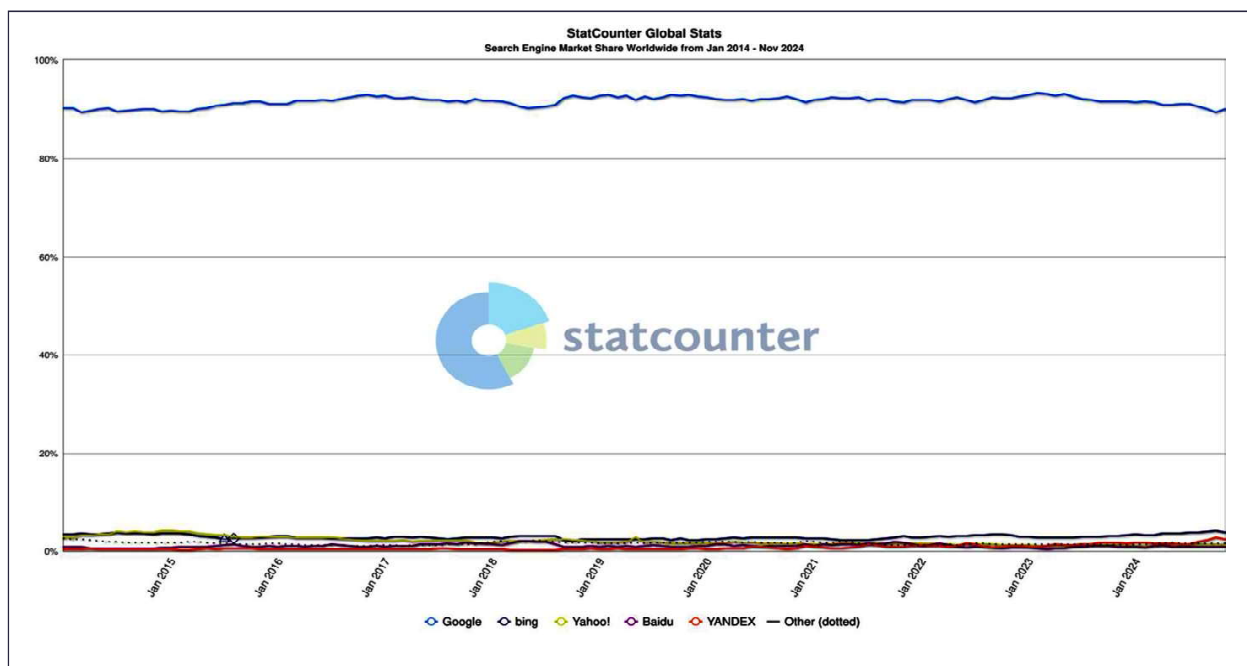


Figure 1: 2014.01-2024.11 Global Search Engine Market Share

Source: <https://gs.statcounter.com/>

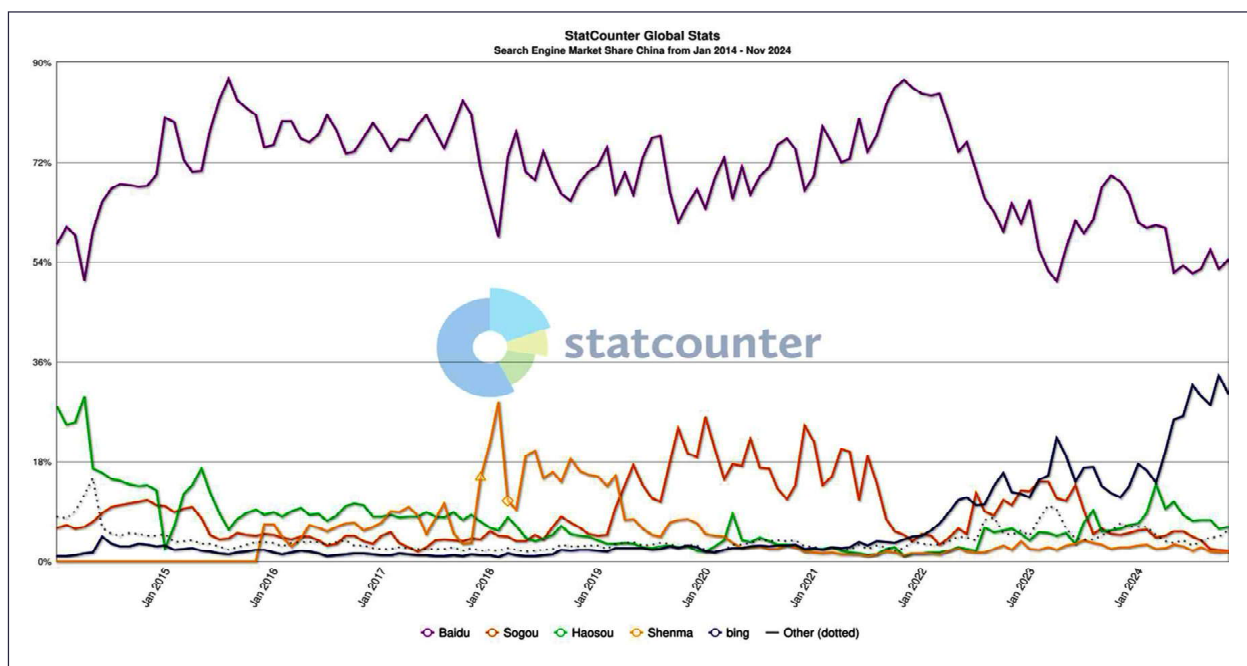


Figure 2: 2014.01-2024.11 Chinese Search Engine Market Share

Source: <https://gs.statcounter.com/>

3. Results

The study found that the Internet search trend for the term “vocational education” has steadily increased, and there were five obvious fluctuations, all of which were rapid rise and then decline (Figure 3). The trend of Baidu index on PC and mobile devices was similar. The “user portrait” generated by Baidu Index can clearly present the information related to vocational education, and the provinces and cities in the dark blue area represent the larger search volume (Figure 4), reflecting that the people in East China and North China are the main groups of people concerned about vocational education. In addition, from the user attributes of Baidu Index, it can be seen that the people who search for “vocational

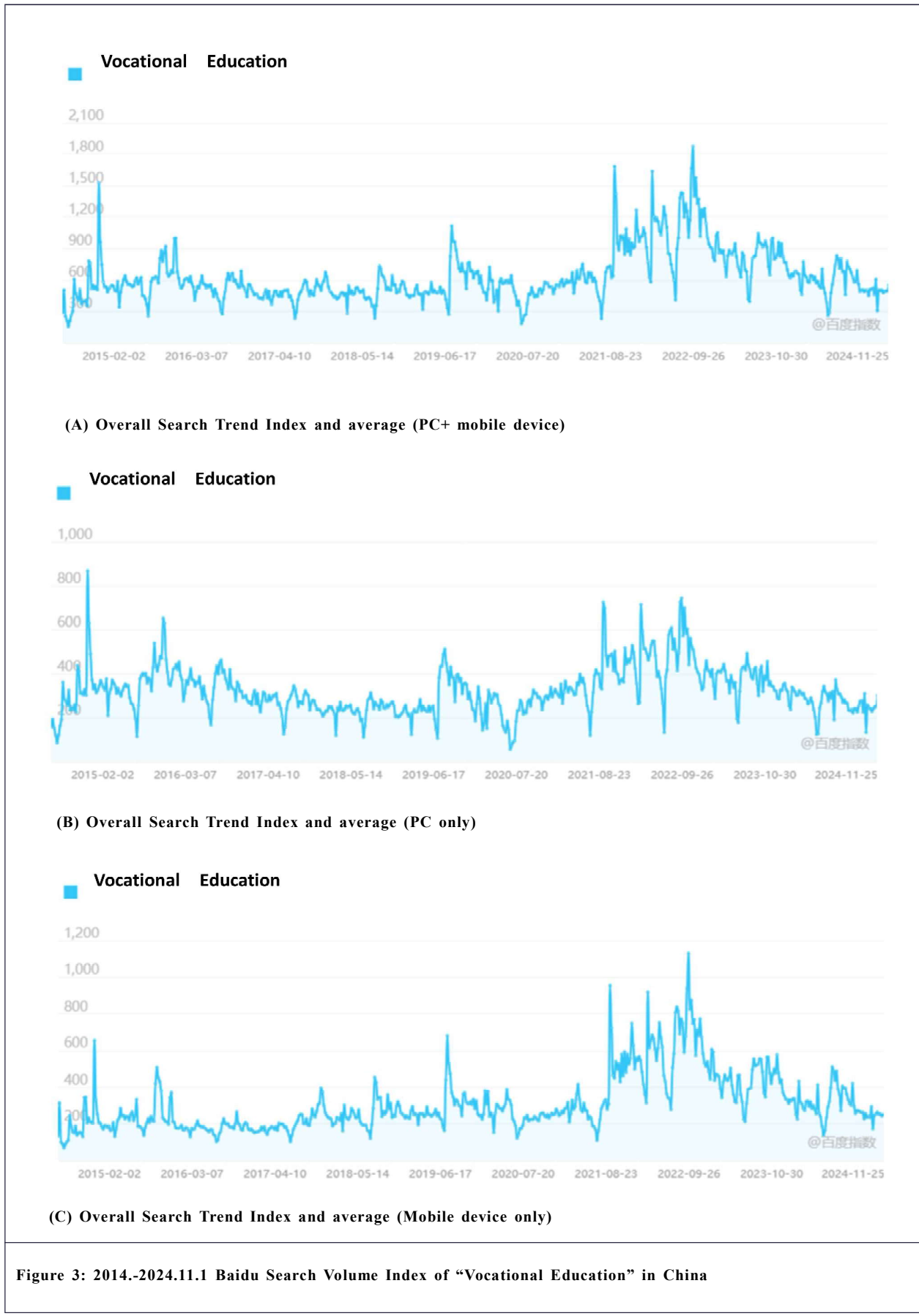


Figure 3: 2014.-2024.11.1 Baidu Search Volume Index of “Vocational Education” in China

education” and its related content are mainly 30-39 years old and 20-29 years old, accounting for 35% and 33.14% respectively. Male attention is slightly higher than female, accounting for 51.2% and 48.8% respectively (Figure 5).

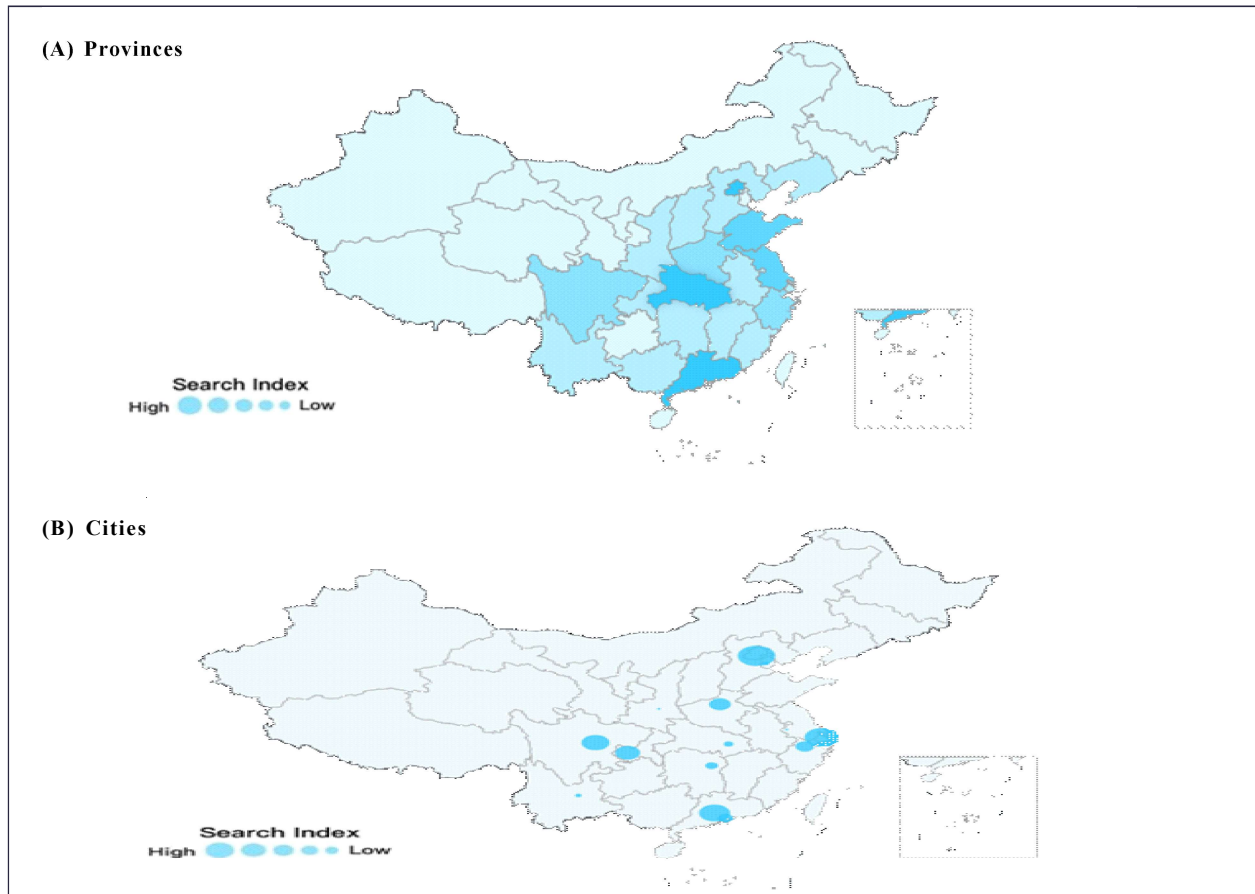


Figure 4: Baidu Index Map of “Vocational Education” (Date: 2014.1.1-2024.11.1)

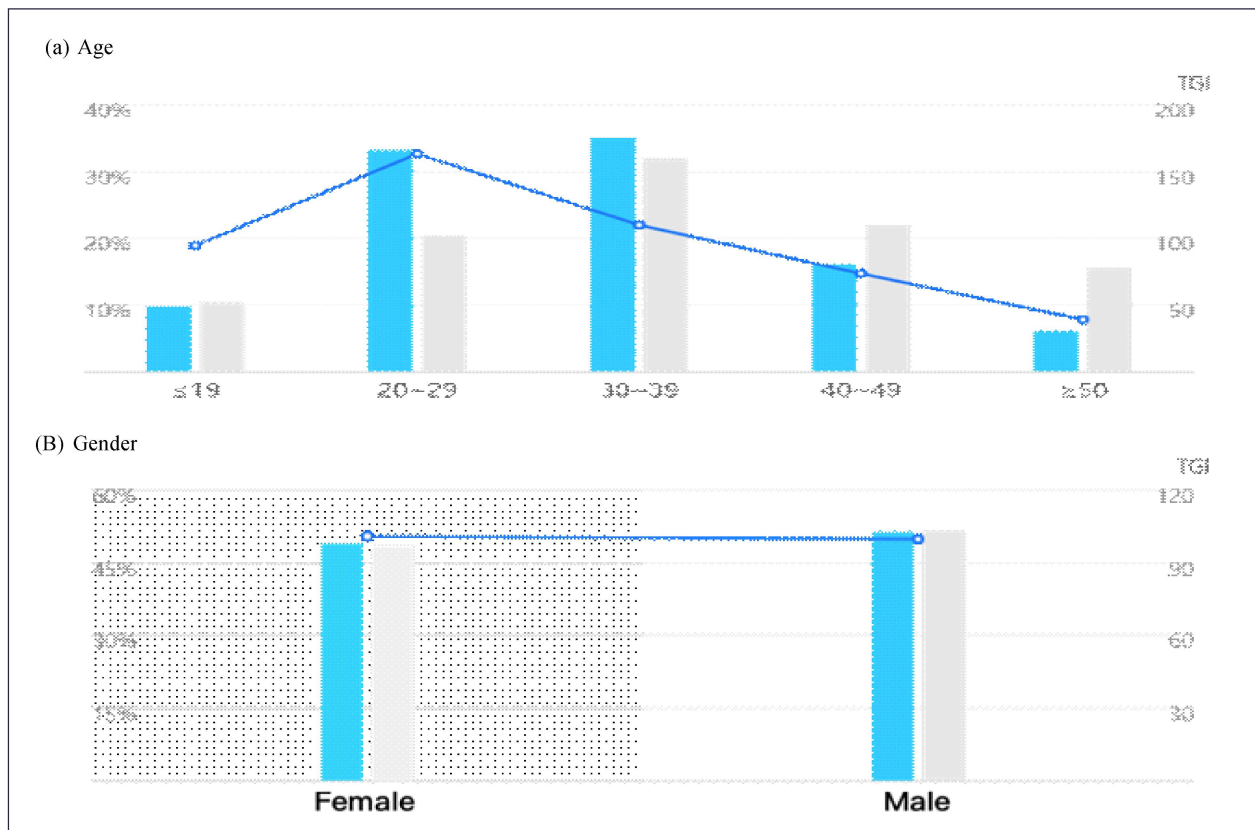


Figure 5: Search for “Vocational Education” Demographics

A ranking of popular search terms related to “vocational education” found that Baidu users paid the most attention to “craftsman spirit” (Figure 6). This study summarizes the changes in the demand map from May 1, 2024 to November 1, 2024, and it can be seen that “engineer” and “vocational training” are second only to “craftsman spirit” (Table 1).



Figure 6: Word Cloud for Words Related to “Vocational Education”

Table 1: Search Terms Related to “Vocational Education”		
Orders	Keywords	Frequency
1	Craftsmanship Spirit	1445
2	Engineer	1045
3	Vocational Training	971
4	Digitization	682
5	Vocational Secondary School	529
6	Modernization	517
7	Skill	505
8	Industry	445
9	Higher Vocational Education	427
10	Vocational Education Law	289

4. Discussion

China’s vocational education began with the ship Administration School founded by the Westernization School in Fuzhou more than 150 years ago, which was the beginning of practical education in China (Li and Liu, 2016), but vocational education was still a tributary of general education at that time. There is no doubt that in the process of educational modernization, the state has given more and more policy support to the development of vocational education (Zheng, 2013). At the same time, whether the public pays attention to “vocational education” and to what extent, the trend presented by big data can be analyzed. According to the 54th Statistical Report on the Development of the Internet in China by the China Internet Network Information Center (CNNIC), as of June 2024, the number of Internet users in China was nearly 1.1 billion (1.09967 billion people), an increase of 7.42 million over December 2023 (Figure 7), and the Internet penetration rate reached 78.0%, an increase of 0.5 percentage points over December 2023. The Internet penetration rate of Chinese netizens has made a new breakthrough, and the Internet has brought great convenience to the Chinese people.

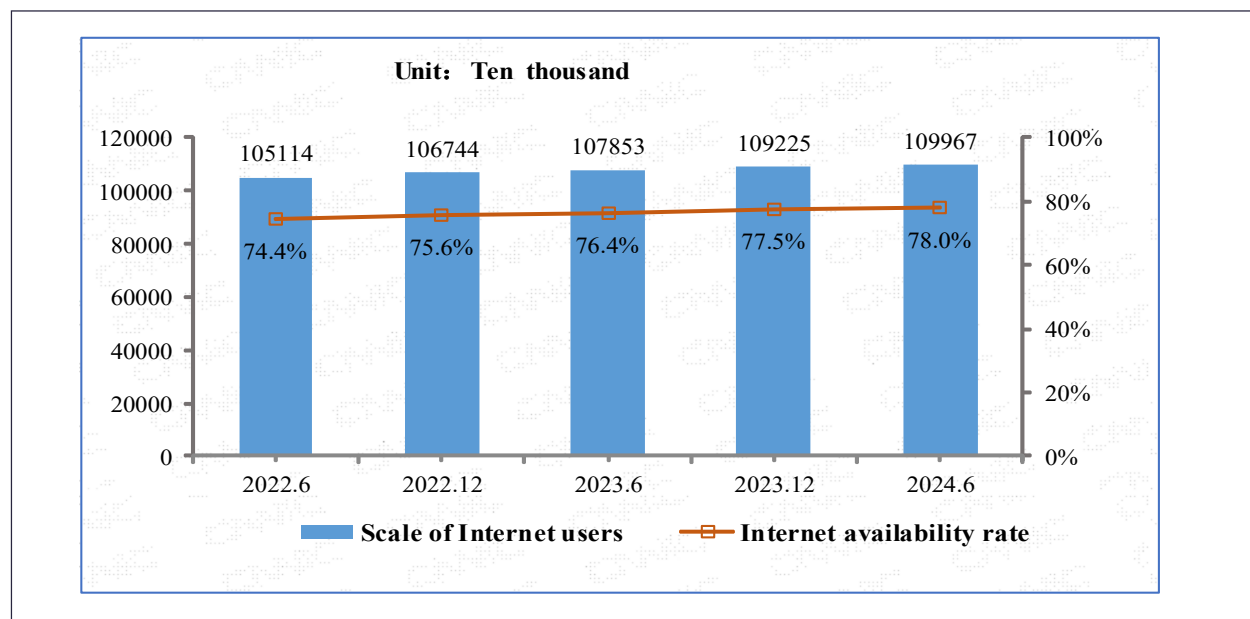


Figure 7: 2023.12-2024.6 The Number of Internet Users and Internet Availability

Source: [https:// www3.cnnic.cn/n4/2024/0829/c88-11065.html](https://www3.cnnic.cn/n4/2024/0829/c88-11065.html)

In the first half of 2024, various types of Internet applications in China continue to deepen, and the scale of users continues to grow. The search engine has 2.3 million fewer users than it did in December 2023, but with 824 million users, the scale is still huge. (Table 2).

Application	2023.12 User Size (Ten Thousand)	2023.12 Usage Rate	User size 2024.6 (Ten Thousand)	2024.6 Usage Rate	Growth Rate
Instant	1,05,963	97.00%	1,07,787	98.00%	1.70%
Online video	1,06,671	97.70%	1,06,796	97.10%	0.10%
Short video	1,05,330	96.40%	1,05,037	95.50%	-0.30%
Online payment	95,386	87.30%	96,885	88.10%	1.60%
Online shopping	91,496	83.80%	90,460	82.30%	-1.10%
Search engine	82,670	75.70%	82,440	75.00%	-0.30%
Network News	77,191	70.70%	76,441	69.50%	-1.00%
Webcast	81,566	74.70%	77,654	70.60%	-4.80%
Internet music	71,464	65.40%	72,914	66.30%	2.00%

Source: [https:// www3.cnnic.cn/n4/2024/0829/c88-11065.html](https://www3.cnnic.cn/n4/2024/0829/c88-11065.html)

In recent years, scholars have used the Baidu Index to study tourism (Tan *et al.*, 2021), infectious diseases (Zheng and Zhai, 2021) and investment (Song, 2019). However, the Baidu index has not explored enough in the field of education, and the data trail generated by keyword searches for “vocational education” has not been paid attention to. This study attempts to explore the public’s online behavior toward vocational education in the past decade, and the research confirms that Baidu Index can effectively measure the degree of public concern about vocational education.

The trend study shows that between January 1, 2014 and November 1, 2024, the search trend for the term “vocational education” shows five fluctuations, characterized by an increase followed by a decrease (Figure 3). The analysis shows that the five fluctuations are all due to the promulgation of documents related to vocational education or the holding conferences related to vocational education, which has aroused widespread public concern.

The first fluctuation is that the search trend of “vocational education” showed an upward trend before June 23, 2014, and the overall search trend showed a downward trend after June 23, 2014. But the search index for “vocational education” was not low. The main reason for the increase in the search index of “vocational education” at this stage is that on June 22, 2014, the government issued the “*Decision of The State Council on Accelerating the Development of Modern vocational education*”, which put forward the overall requirements, objectives and tasks, key work and safeguard measures for accelerating the development of modern vocational education (The State Council, 2014). The document emphasizes speeding up the construction of modern vocational education system, deepening the integration of production and education, school-enterprise cooperation, and cultivating hundreds of millions of high-quality workers and technical talents. After the release of the *Decision of The State Council on Accelerating the Development of Modern Vocational Education*, vocational education has attracted wide attention from the public, and the search trend of the term “vocational education” has risen rapidly. The main reason for the decline of “vocational education” is that since the release of the “*Decision of The State Council on Accelerating the Development of Modern vocational education*” on June 22, the construction of vocational education system has achieved remarkable results. The quality of personnel training has been continuously improved. The public has made use of various online learning platforms to obtain more learning resources, which has promoted the development of individual vocational education (National Bureau of Statistics, 2024). The public’s attention to “vocational education” has gradually declined due to in-depth or even complete understanding of it.

The second fluctuation is that before February 24, 2019, the search for vocational education showed an upward trend, and after February 24, the overall trend of the search index for “vocational education” gradually declined. The main reason for the rise is that on February 13, 2019, The State Council issued a national vocational education reform implementation plan. The plan emphasizes that vocational education has the same status as general education, and that the modernization of vocational education is an important part of the modernization of education. It is necessary to constantly improve the vocational education and training system, take promoting employment and adapting to the needs of industrial development as the guidance, encourage and support all sectors of society, especially enterprises, to actively support vocational education (The State Council, 2019), and focus on cultivating high-quality workers and technical and skilled personnel. After the announcement of the plan, the keyword search volume of “vocational education” increased significantly, indicating that the public obtained more information about “vocational education” through the search engine and more deeply recognized the connotation of “vocational education”.

The third wave is that the search for vocational education shows a rapid upward trend before April 18, 2021. After April 18th, the attention to “vocational education” gradually declined. The reason is that on April 12, 2021, China held the National Vocational Education Conference, which reflected the state’s high attention to vocational education. This conference creatively put forward the concept and of building a skilled society, and opened a new journey for China’s vocational education.

The fourth wave is that the search for vocational education shows a rapid upward trend before October 17, 2021, and then a gradual decline, because on October 12, The General Office of the State Council issued *the Opinions on Promoting the High-quality Development of Modern Vocational education*, which emphasizes that vocational education is an important part of the national education system and human resources development. Shouldering the important responsibility of cultivating diverse talents, inheriting technical skills, and promoting employment and entrepreneurship (The State Council, 2021).

The fifth wave is that before May 1, 2022, the search for vocational education showed a rapid upward trend, and after May 1, the search index of “vocational education” gradually fell, but it is still higher than before. This is due to the revised “*Vocational Education Law of the People’s Republic of China*” adopted by the Chinese government meeting on April 20, 2022. China’s Vocational Education Law was first promulgated in 1996, the first revision in 26 years, and the revised law clarifies the purpose of vocational education. It clarifies the definition and scope of vocational education, highlights the status and role of vocational education, and raises the level of management of vocational education (The National People’s Congress, 2022). Before and after the revision of the Vocational Education Law, people’s attention to it has increased rapidly.

By the end of 2023, China’s working-age population between 16 and 59 will reach 864.81 million, accounting for 61.3%. On the whole, China is still rich in labor resources, but the working-age population has decreased. Therefore, the economic structure and the development of science and technology need to be adjusted. Economic reform and development cannot be achieved without the support of people. Vocational education serves individual vocational cognition and skills, indirectly serves the industry, effectively improves the quality of workers, and supports the market development and change needs.

It is not difficult to see that the Chinese government has issued various documents on “vocational education” from the aspects of policy decisions, implementation plans, laws and regulations. China has always attached great importance to the development of vocational education.

Through further research, it is found that the search trend of PC terminal and mobile terminal is the same, but the search frequency of mobile terminal users is higher than that of PC terminal. The reason may be due to the rapid increase in the popularity of the Internet in people’s lives, while the number of people using mobile phones to surf the Internet continues to increase. Search data on mobile phones is the main source of mobile data. According to the *54th Statistical report on China’s Internet Development* released by the China Internet Network Information Center, By June 2024, 99.7 percent of Chinese netizens will use mobile phones to access the Internet. The proportion of Internet users using desktop computers, laptops, TVs and tablets was 34.2%, 32.4%, 25.2% and 30.5% respectively. The proportion of Internet users using personal wearable devices, smart home device and intelligent connected car was 24.2%, 21.9% and 10.4% respectively (Figure 8), the number of mobile Internet users in China reached 1.096 billion, an increase of 5.28 million compared with December 2023 (Figure 9).

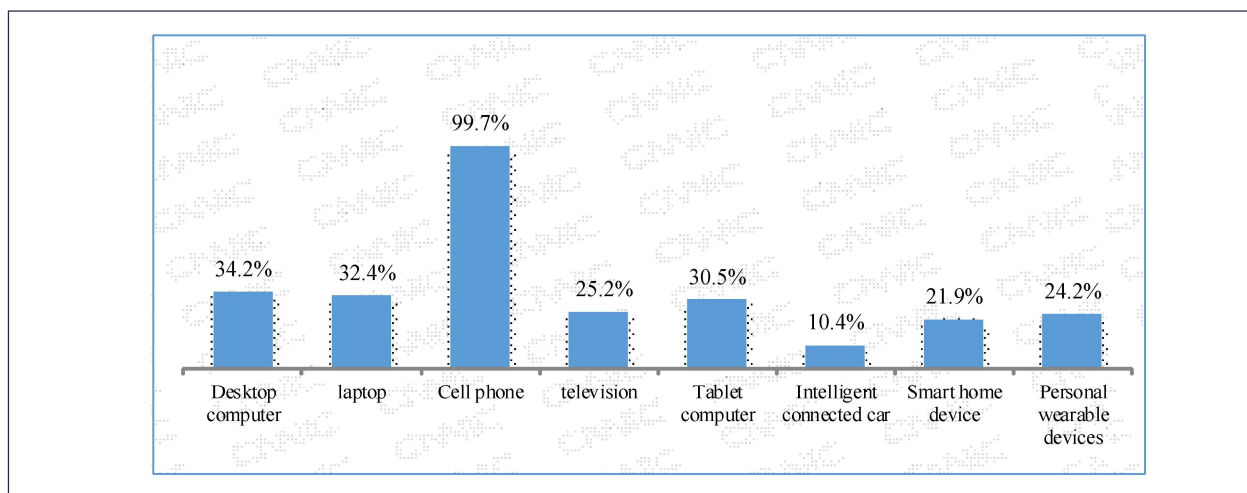


Figure 8: Usage of Internet Access Devices

Source: <https://www.cnnic.net.cn/n4/2023/0828/c88-10829.html>

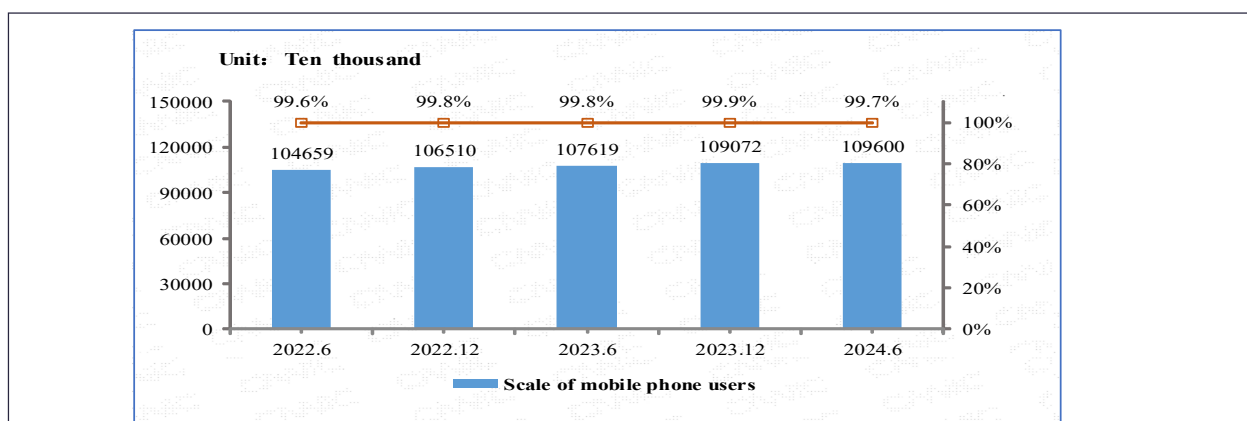


Figure 9: 2022.6-2024.6 Size of Mobile Phone Users and Proportion of Total Internet Users

Source: <https://www.cnnic.net.cn/n4/2023/0828/c88-10829.html>

The demand map data in the Baidu index can reflect the degree of public attention to “vocational education” and the distribution of demand. From the trend study, we can clearly see the peak value, so this study selects the top ten terms with the peak search popularity for analysis (Table 1). The terms “craftsman” and “engineer” appear most frequently. On the one hand, “craftsman spirit” has been mentioned many times in policy documents and leadership speeches, emphasizing that the craftsman spirit is a value orientation of reverence for the profession, dedication to work, and pursuit of perfection in products and services. Specific to the individual craftsmen, they often have good qualities such as focus, persistence, patience, indifference, innovation, and continuous breakthrough, representing the highest level of technical skills and talents in manufacturing power (Ministry of Education, 2016). Therefore, the spirit of craftsman has been widely concerned, and vocational education competitions named after “craftsman” have emerged in endlessly (Chongqing Human Resources and Social Security Bureau, 2024). In addition, excellent engineers are the ultimate pursuit of vocational education personnel training, which has also received wider attention from the public.

In terms of the geographical distribution of the concerned population, in terms of the ranking of provinces, the first place is Beijing in China, followed by Guangdong and Shandong (Figure 4). As the capital of China, Beijing is an important position for the function construction of the national political center, an important carrier for the function construction of the cultural center, an important window for the function construction of the international exchange center, and an important support for the function construction of the scientific and technological innovation center. On September 17, 2019, the Beijing Municipal Government issued *the Capital Education Modernization 2035*. It proposes to accelerate the integrated development of regional vocational education, effectively support urban development, and lead the development of modern education with capital characteristics, Chinese characteristics and world level (Beijing Municipal Education Commission, 2019). In June 2022, the General Office of the Beijing Municipal People’s Government issued the *Implementation Plan on Promoting the High-quality Development of Vocational Education*, which requires deepening the reform of the vocational education system and mechanism in Beijing. To continuously improve the ability of vocational education to serve economic and social development and industrial transformation and upgrading. To effectively raise the social importance of vocational Education (Municipal Government of Beijing Municipality, 2022). May 2024 Beijing Municipal Education issued *Key Points of Beijing’s Vocational Education and Adult Education Work in 2024*. Moreover, Beijing’s important strategic position makes the public in Beijing pay the most attention to the development of vocational education.

Guangdong Province is the vanguard of China’s reform and opening up, and has long been at the forefront of the country in terms of economic scale and industrial scale, which provides favorable conditions for the development of vocational education in Guangdong. Guangdong has actively promoted the coordinated development of vocational education and general education, and built a vocational education system that meets the needs of Guangdong’s economic and social development. It has strengthened legislative protection, promulgated the *Regulations of Guangdong Province on Vocational Education*, and adhered to the policy orientation (Guangdong Provincial Department of Education, 2018). It has successively issued a number of policy documents such as the *Opinions of the People’s Government of Guangdong Province on Establishing a Pilot Province for Comprehensive Reform of Modern Vocational Education*, the *Plan for the Construction of the Modern Vocational Education System of Guangdong Province (2015-2020)*, and the *Three-year Action Plan for Expansion, Quality Improvement and Strong Service of Vocational Education of Guangdong Province*, continuously increasing investment in vocational education. In the past ten years, the total investment in vocational education has reached 448.663 billion yuan (Guangdong Municipal People’s Government, 2022). With this development background, coupled with the fact that Guangzhou, the provincial capital, is one of the first pilot cities to build a learning city, there are 625 vocational colleges and universities in the province with 2.805 million students by May 2022 (Ministry of Education, 2022). It has made outstanding contributions in the process of promoting vocational education practice. Public attention to vocational education in Guangdong is higher than in other regions, which is why Guangdong ranks second in the index of public searches for “vocational education”.

Shandong Province is China’s largest education province, Shandong has produced a large number of celebrities, known as the “hometown of Confucius and Mencius, a land of rites and ceremonies”, is one of the birthplaces of Chinese civilization. Shandong Province promulgated the *Regulations on Vocational Education of Shandong Province* in December 2000, which were revised in January 2024. The regulations point out that vocational education is an important part of the national educational cause and an important way to promote economic and social development and employment (Shandong Provincial Department of Education, 2024). Vocational education should guide the students in such aspects as professional ethics education, vocational knowledge and vocational skills, so as to comprehensively improve the quality of the students. Statistics show that in 2023, Shandong Province will have 742 vocational colleges with a registration of more than 3.08 million students, with a registration of more than 470,000 in secondary vocational

education schools (secondary vocational schools and technical schools) and more than 790,000 in higher vocational education schools (vocational colleges, vocational colleges and technical colleges) ([Shandong Provincial Department of Education, 2024](#)). Shandong is a veritable major province of vocational education. In addition, Shandong is the first province in China to jointly build a national vocational education innovation and development highland and the first province to jointly build a provincial modern vocational education system pilot model. The reform of vocational education has achieved remarkable results, making important contributions to the reform and development of vocational education throughout the country. Shandong people's attention to vocational education ranks third in the country.

In terms of city ranking, Beijing ranks first, followed by Shanghai. In December 2019, the General Office of Shanghai Municipal People's Government issued the *Action Plan for the High-quality Development of Vocational Education in Shanghai (2019-2022)*, in order to implement the *National Implementation Plan for Vocational Education Reform* and further promote the high-quality development of vocational education in Shanghai in the new era. In 2022, the Shanghai Municipal Education Commission issued the *Plan for Promoting the Construction of High-level Vocational Schools and Professional Groups in Shanghai (2022-2024)*, which clearly proposed that it is necessary to optimize the type positioning of vocational education, focus on improving the modern vocational education system in Shanghai, and strive to build a group of brand vocational schools. Shanghai takes the lead in the country in exploring a new mechanism for training vocational education talents. Under the great attention and unified leadership of the state ([Shanghai Municipal People's Government, 2021](#)), Beijing and Shanghai, two municipalities directly under the central government, as pilot cities for building learning cities, have made great progress in the construction of vocational education systems. Therefore, compared with other cities, Beijing and Shanghai pay more attention to "vocational education", ranking first and second respectively.

In this study, social attention data for ten years from January 1, 2014 to November 1, 2024 were selected for population attribute analysis (Figure 5). The analysis of the data shows that the sex ratio of men and women is 51.2% and 48.8%, respectively, which reflects that the proportion of men and women paying attention to vocational education is basically equal. In terms of age distribution, the group with the highest social attention is the 30~39 years old group (35 percent), which represents the attention of some parents of students or career middlemen to vocational education. At present, with the rapid development of science and technology, the continuous adjustment of industrial structure, the changing workplace environment and the rise of new industries, these changes bring new opportunities and challenges to workers ([Chen, 2023](#)). They have to re-examine their career planning. Through vocational education, they can upgrade their skills, change industries, or prepare for starting their own businesses. Secondly, the social group that pays more attention to vocational education is the youth group aged 20-29 (33.14%). Most of this age group are already working, while a small number are studying or facing graduation. Competition in the new era makes young people realize that receiving vocational education is conducive to improving their skills and effectively enhancing their social competitiveness ([Dai, and Li, 2024](#)), followed by those aged 40-49 (16.05%). The group <19 years old pays less attention (9.74%), and the group above 50 years old pays the lowest attention (only 6.06%).

5. Conclusion

Baidu Index can be used to understand the degree of public concern about vocational education. In terms of gender, there is no significant difference between men and women in their attention to vocational education. Beijing ranks first in vocational education among all cities in China. The search trend of "vocational training", which is related to "vocational education", is the same as that of "vocational education", but the number is significantly higher.

6. Limitations

Baidu Index makes it easy for researchers to access data quickly, but it has some limitations. Firstly, Baidu Index data can only reflect users' search intentions, but not users' specific needs and search behaviors. More comprehensive data collection and in-depth data analysis are needed to deeply understand the reasons for changes in behavior and data. Secondly, Baidu Index serves the research by analyzing trend studies, demand graphs and user profiles, but currently does not provide demographic data. Thirdly, this study only discusses the data collected by Baidu Index, and does not discuss the data obtained from other search engines or the search behavior of users in other regions. Fourthly, some of the search data of "lifelong education" obtained from Baidu Index may come from groups who really want to know about vocational education, such as students, office workers, non-employees, and retired people. Another part of the data may come from researchers at all levels, teachers and other groups conducting research in the field of vocational education, who all contribute to the search volume of "vocational education", so it is difficult to accurately grasp the number of people who really need vocational education.

All in all, although there are still some limitations in the Baidu Index, it needs to be continuously improved and perfected. However, based on Baidu Index, we can roughly understand the search popularity of the keyword, and then analyze the industry and events represented by the keyword, as well as a series of information such as user portraits, behaviors and user needs.

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Cite this article as: Qingxia Wang and Vilaiphone Sulixay (2024). Utilizing Baidu Index to Investigate the Public Concern Towards Vocational Education in the Chinese Mainland. *International Journal of Education and Teaching*, 4(2), 39-51. doi: 10.51483/IJEDT.4.2.2024.39-51.