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Study on the Influencing Factors of Network Attention in Secondary Vocational Education

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Abstract: In order to explore the status quo of secondary vocational education in China, the network attention is adopted as the observation data of the degree of importance attached to secondary vocational education by the public, and the Herfindahl-Hirschman Index, coefficient of variation, seasonal concentration index, and Moran's index are used to analyze the temporal and spatial distribution characteristics of the network attention to secondary vocational education, and to analyze the influencing factors of the differences in the network attention to secondary vocational education in China. The results show that: (1) Secondary vocational education network attention has certain seasonal fluctuation characteristics, and the relevant search content and search time are closely related to work; (2) Regional development is not balanced, with higher attention in the central region and lower attention in the western region; (3) The level of regional economic development, the number of Internet facilities, and the number of secondary vocational schools are the main factors influencing the network attention of secondary vocational education.

Keywords: Secondary Vocational Education, Network Attention, Influencing Factors.

1. Introduction

The trend of digitalizing secondary vocational education is underway, the Internet has become an indispensable part of school management, and its search engine is an important means for the public to obtain information. The latest report released by China Internet Information Center shows that China's network users have reached 1.067 billion, of which there are 795 million users using search engines. A large number of users have generated huge network big data, how to utilize the big data which contains a large amount of information is one of the most important issues in the current Internet application[1] .

The research on secondary vocational education has went through a series of policies to school-enterprise cooperation, integration of production and education, modern apprenticeship system, artisan spirit and other buzzwords constantly appearing in the media and academic research[2-4] . However, the degree of attention paid by the public, the differences in attention paid by provinces and cities, and the influencing factors of secondary vocational education's attention are worthy of in-depth exploration and reflection. On the basis of analyzing the network attention of secondary vocational education, we will explore the temporal and spatial differences in the evolution of secondary vocational education between different regions and years and the reasons for them, analyze the factors affecting the network attention of secondary vocational education, and then provide countermeasures and suggestions for the development of secondary vocational education in China in a targeted way.

2. Data Sources and Research Methodology

2.1. Data sources

Using the Baidu Index platform, "secondary vocational education" and "secondary" (or "secondary education", "secondary school") were used as search terms to collect data from January 2018 to December 2022. The annual average value of Baidu Index of the whole country was collected as the overall data of network attention in the search results, and the attention of 34 provinces was collected as the regional data.

Indicators such as total annual average consumption by region, quantity of Internet port connections, average per-pupil expenditure on secondary vocational education, and the quantity of secondary vocational education schools by region published on the website of the National Bureau of Statistics were collected as the basis for the discussion of influencing factors.

2.2. Research methodology

Drawing on the previous research methods of spatio-temporal differences in network attention, the Herfindahl-Hirschman Index, the coefficient of variation, the Moran index, and the seasonal concentration index were used respectively to measure the relative differences in the distribution of network attention in secondary vocational education[5] , and robust regression methods were used to explore the influencing factors of regional differences in network attention.

3. Temporal and Spatial Distribution Pattern of Secondary Vocational Education Network Attention

3.1. Annual distribution characteristics

In 2018, secondary vocational education launched a large-scale reform, whether it is the deployment of the direction or the release of new regulations, looking back at the whole year of 2018 documents, the network attention of secondary vocational education has increased significantly.The fluctuation of China's secondary vocational education network attention since 2018 is shown in Fig.1, and the Baidu index has increased from 9,887 to 20,900 of the average level of attention. Which grew rapidly in the pre-epidemic stage (January 2018 to December 2019), the Baidu index surged to 21,633 in August 2019, exceeding the average level of

attention in the past five years. While the network attention level grew slowly at the end of 2019 and dropped to the lowest point of about 12,000 average attention level in January 2020. Between 2020 and 2022, the network attention level of secondary vocational education rapidly developed generally, and the annual average index reached a peak of nearly 35,000 in June 2022, which overall showed a trend of increasing and then decreasing each year.

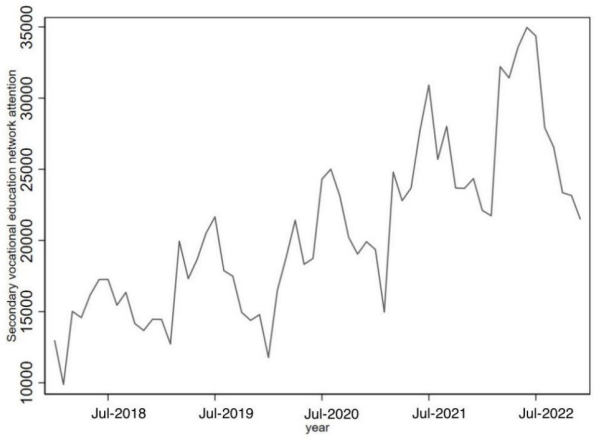

Figure 1. Annual Distribution of Secondary Vocational Education Web Attention

3.2. Characteristics of monthly distribution

In order to analyze the monthly distribution characteristics of network attention, the Herfindahl coefficient of network attention and the seasonal index were calculated by month for the years 2018-2022 respectively, in which the Herfindahl coefficient for the years 2018 and 2019 were 0.085, and the Herfindahl coefficients for the years 2020, 2021 and 2022 were 0.086, and the results of which were all less than 0.1. There is a certain time difference in the distribution of secondary vocational network attention; the seasonal index in each year is 0.9, 1.09, 1.13 and 0.89, respectively.The index is higher in the third quarter of each year, and the overall secondary vocational education network attention has a certain seasonal distribution characteristics.

In order to further study the seasonal distribution law of network attention, the stacked area plot of monthly attention share is drawn based on the statistics of Baidu index in each month (Fig.2).The overall network attention in 2018-2022 shows the cyclical distribution characteristics of alternating off-peak and peak seasons, which is specifically reflected in the fact that January to February and October to December are generally the off-peak seasons in each year, and attention drops to the lowest level in February; then attention begins to rise rapidly; March to September is the peak season, and attention rises to the highest level in April and July respectively, and then attention begins to fall. In general, January to February and October to December are the off-season every year, and the attention level drops to the lowest level in February, and then starts to rise rapidly; March to September is the peak season, and the attention level rises to the highest level in April and July respectively, and then starts to drop. The timing of the above inflection points of attention in different time periods highly coincides with the time periods before and after the start of secondary school; the peak season is generally located in the early part of the spring and fall semesters of the calendar year, which is similar to the start of secondary school, and the off-season is generally located in the middle of the winter vacation, and it is also found that the level of attention in spring and summer is generally higher than that in fall and winter. The above characteristics reflect the fact that the level of attention to secondary vocational education is clearly influenced by the time of the organization of related activities.

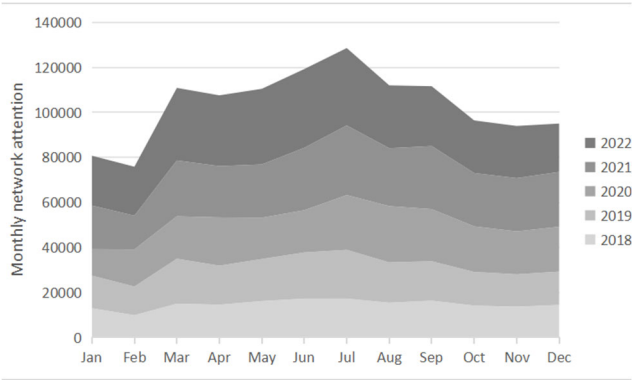

Figure 2. Monthly Distribution of Secondary Vocational Education Web Attention

4. Regional Distribution of Secondary Vocational Education Network Attention

This study collects data on the total level of network attention in 34 provinces in China for the period from January 1, 2018 to December 31, 2022, and considering the differences in the regional population bases, the corrected level of network attention is used$\overline{A}$ as an indicator reflecting the actual level of regional attention, calculated by the formula:$\overline{A} = \frac{A_i}{T_i}$. In the formula:A_i is the total amount of attention level in a region; T_i denotes the number of demographics in the region. Calculating the level of network attention in different regions, the statistical results of the coefficient of variation of network attention and the Gini coefficient in each region are 0.47 and 0.474, respectively, indicating that there are significant differences in the level of network attention in different regions.

Network attention also reflects the gap in the development level of secondary vocational education in different regions. In order to scientifically reflect the situation of secondary vocational education network attention in different regions of China, it is divided into three major regions of east, center and west according to geographic location and level of economic development, of which: (1) The eastern region, including Beijing, Fujian, Guangdong, Hebei, Jiangsu, Liaoning, Shandong, Shanghai, Tianjin, Zhejiang and Hainan, whose average value of attention is much higher than that of other regions; (2) The central region, including Anhui, Henan, Hubei, Hunan, Jiangxi, Shanxi, Heilongjiang and Jilin, whose average value of concern is in the middle; (3) Western region, including 12 regions, ranked from high to low order as Sichuan, Guangxi, Chongqing, Shaanxi, Guizhou, Yunnan, Xinjiang, Gansu, Inner Mongolia, Ningxia, Qinghai and Tibet. The regional distribution of secondary vocational education network attention is shown in Fig.3, and the degree of development in each region varies greatly. From the spatial scale, Guangdong, as one of the core cities of the Pearl River Delta, has a greater advantage in the evolution of secondary vocational education, with a network attention of more than 400,000, which is the highest value; on the whole, the

development of the three regions of North China, Central China, and East China is faster, and the average degree of attention is relatively high, while the development of Northeast China, South China, Northwest China, and Southwest China is slower, with a high degree of attention close to the region of 0; there is also big gaps in network attention between the various provinces (regions) in the same geographic region, also have large differences in network attention; the result of using Stata to calculate the Moran Index of regional network attention is 0.091, indicating that there is no correlation between the network attention of various regions, and that the effect of neighboring provinces driving each other secondary vocational education is not obvious.

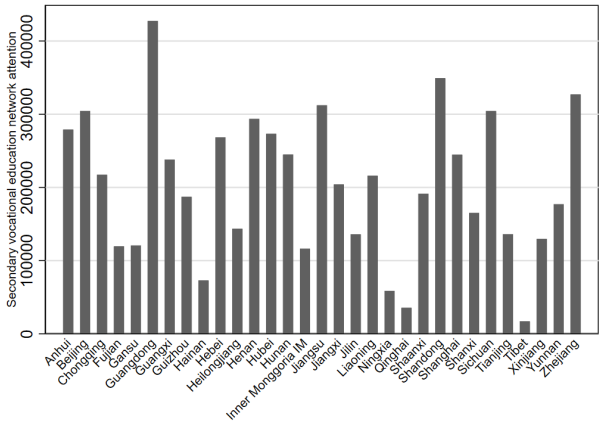

Figure 3. Regional Distribution of Secondary Vocational Education Network Concerns

5. Factors Affecting the Development of Secondary Vocational Education

5.1. Assumptions on Impact Factors

The inter-provincial attention mean as a proxy indicator for the regional development level of secondary vocational education, starting from the influence of information demand and information access, and based on[6,7] of previous related studies, the following hypotheses are put forward: the regional economic development level, the quantity of Internet facilities, the quantity of secondary vocational schools, and the investment of education funds and other indicators will affect the development level of secondary vocational education.

5.1.1. Regional economic development level

It can be seen from the level of network attention in different regions that the development of secondary vocational education has certain regional differences, and regions with a higher level of economic development have a higher level of attention. Therefore, it is assumed that the network attention level of secondary vocational education development is related to the regional economic development level, using the average annual total consumption of each region, which is recorded as x_1 .

5.1.2. Number of Internet facilities

The Internet is the main way of obtaining information at present, and as a search platform its convenience also affects the user's search behavior. Therefore, it is assumed that the network attention is related to the number of regional Internet facilities volume correlation, using the number of Internet broadband access ports per capita, denoted as x_2 .

5.1.3. Number of secondary vocational schools

The number and size of secondary vocational schools reflect the supply capacity and conditions of secondary education, as well as the attractiveness and training quality of secondary education. Therefore, it is assumed that the evolution of secondary vocational education is related to the number of secondary vocational schools, which is recorded as the number of secondary vocational schools as x_3 .

5.1.4. Education expenditure

There is a spatial dependence in the efficiency of secondary vocational education funding[8] Therefore, it is assumed that the evolution of secondary vocational education is related to education expenditure, measured by the average education expenditure per secondary student in each region, denoted as x_4 .

5.2. Calculation process and results

The hypothesized influences were analyzed by robust regression using Stata.

5.2.1. Randomness test

To ensure that the study is statistically significant, the dependent variable needs to be Randomness test was conducted and S-W test was used and the significance p-value was 0.543, the level does not present significance and the original hypothesis could not be rejected, therefore the data satisfies normal distribution.

Table 1 Randomness test

Variable	Median	Mean	S.D.	Skewness	Kurtosis	S-W	K-S
Network Attention	189353.5	186006.706	109877.047	-0.018	-0.648	0.973 (0.543)	0.067 (0.995)

5.2.2. Correlation analysis

According to the correlation test standard, it is generally considered that the absolute value of the correlation coefficient is greater than 0.8 for high correlation, in 0.5-0.8 for medium correlation, in 0.3-0.5 for low correlation, and less than 0.3 for weak correlation. The number of Internet ports x_2 is highly correlated with secondary school network attention, and the variables eligible for moderate correlation include the total consumption per capita x_1 and the number of secondary schools x_3 indicator variables, while the average education expenditure per student in secondary school x_4 indicator variable is weakly correlated with network attention. Among the indicator variables, x_1 and x_4 , x_2 and x_3 , x_3 and x_4 are moderately correlated, and the indicator variables x_3 and x_4 are moderately negatively correlated.

5.2.3. Calculation results

Excluding the three regions that are lagging behind in terms of network attention, and based on the observed data of the other 31 regions, using x_1 to x_4 for the regression, and the calculation results are shown in Table 1. In the outcomes, x_1

and x_2 passed the significance test ($p \leq 0.1$), and the hypothesis of their influencing factors is valid, while x_3 and x_4 failed the significance test. ($p > 0.1$), and the hypothesis of their influencing factors is not valid. The fit effect indicator R_2 , which represents the regression as a whole, is 0.88 and F is 0.000, Prob > F and F < 0.05, which passes the significance test.

Table 2 Robust regression results of potential influencing factors

y	Coef.	Std. Err.	t	P>| t |	[95% Conf. Interval]
x_1	1.118144	.1987166	5.63	0.000	[.7096867, 1.526602]
x_2	.0004943	.0000778	6.36	0.000	[.0003344, .0006541]
x_3	3423163	11.91034	2.87	0.008	[9.749577, 58.71369]
x_4	-.3947984	.310185	-1.27	0.214	[-1.032393, .2427961]
_cons	1942.335	7745.774	0.25	0.804	[-13979.33, 17864]

5.2.4. Covariance test

Calculating the inflation factor (VIF) is the most commonly used method to measure whether there is multicollinearity between the independent variables, according to the diagnostic criteria for covariance, if the variance inflation factor (VIF) is more than 10, there is a serious multicollinearity in the regression model, and the range of the variance inflation factor is less than 10 is acceptable, which indicates that there is no problem of covariance exists between the independent variables. The VIF values of each variable (x_1 -x_4) were calculated by Stata as 2.67, 2.62, 2.47, 2.42, and the inflation factors were less than 10, indicating that the variables passed the covariance test.

5.2.5. Endogeneity test

Due to the possible omission of variables or interactions between explanatory and interpreted variables, the results of the regression will be biased and lead to endogeneity problems, which is typically characterized by the correlation between the explanatory variables and the residual terms. Therefore, some scholars have proposed to use the second-order least squares method to test endogeneity using the significance of the regression coefficients of the error terms of the independent variables[9] . The variables x_3 , x_4 are selected as the variables to be tested and the residual series are estimated, and then introduced into the regression estimation of all the variables, the results of which are not significant, indicating that the variables pass the endogeneity test.

5.3. Discussion of results

The analysis of the above results shows that: (1) Regional economic development consumption level is a significant influence factor of network attention. Secondary vocational education has the characteristics of education, but also landing in the work system, and the relationship with the economy appears to be more closely[10] , the economic situation in China is trending upward year over year, economic development is bound to put forward increased standards on the quality of productive forces, and at the same time, the secondary vocational education network attention is also showing year-on-year growth, the public's attention to the network of secondary vocational education able be a reaction to the situation of the public attention of secondary vocational education, the proportion of residents who take it as a potential consumption and active attention is larger. it as a potential consumption and the proportion of residents who actively pay attention to it is larger. (2) The quantity of Internet facilities is a significant influencing factor of network attention. At present, the overall proportion of the already concerned group in the society has considerably expanded, and the quantity of Internet facilities in the evolution of secondary vocational education is the main influencing factor. (3) The quantity of secondary vocational schools is also a significant influencing factor of the network attention. The difference in the quantity of secondary vocational schools in different regions affects the attractiveness and cultivation quality of secondary vocational education, and the more the quantity of secondary vocational schools in a region, the higher its network attention to secondary vocational education is relatively. At present, number of secondary vocational schools in China is showing a downward trend, mainly because of the influence of economic restructuring, college expansion, and the reduction of student sources. (4) The average education expense per student in secondary vocational education is not yet an influencing factor of network attention, and the education expenditure is not yet an influencing factor of network attention, although it is in the quality of schooling, cultivation mode, specialty setting, teacher level, practical training conditions Although education expenditure provides reliable conditions for secondary vocational education in terms of school quality, cultivation mode, specialty setting, teacher level, practical training conditions, etc., it has no obvious role in the concern of secondary vocational education development in each region.

6. Responses and Recommendations

The public's network attention to secondary vocational education is an crucial parameter that can measure the degree of attention it receives and can reflect the current status of public attention to secondary education.

First, to increase public attention and enhance the attractiveness of secondary vocational education. On the whole, the social attention of secondary vocational education is not high, and the problems of low quality and insufficient attraction of secondary vocational education still exist[11] . In the whole national education structure, secondary vocational education is still in a disadvantageous position[12] , the public concern for secondary vocational education is passively reflected in the level of further education, the admission of secondary students is carried out in June~July every year, and the public concern for vocational education in this time period is higher than in other time periods, in addition to pushing up the concern index of vocational education in the aspect of further education, it should also improve the overall social concern. We need to attach great importance to secondary vocational education from the ideological point of view, break down the prejudice of despising secondary vocational and

technical education, and establish the concept that general education and vocational education are equally important; break down the idea of belittling vocational skills, and establish the concept of respecting labor and skills. At the same time, the news media and enterprises and other subjects should be promoted to pay attention to secondary vocational education, should strengthen the publicity and guidance of secondary vocational education, pay attention to the public opinion propaganda work of vocational education, vigorously publicize the national and provincial and municipal relevant supportive policies and measures on the promotion of the development of vocational education, and promote the good practices and experiences of secondary vocational education in a timely manner. At the same time, the news media should widely collect and organize relevant information on the employment of graduates of vocational colleges and universities, and follow up and report typical cases of successful employment and entrepreneurship of typical vocational college and university students, so as to form a favorable atmosphere for the development of vocational education.

Second, the implementation of regional synergistic development of secondary vocational education and the role of regional leadership. East China, North China, Central China and South China have a high degree of regional concern, while Northwest and Northeast China have a low degree of concern for secondary vocational education, showing an uneven and clustered distribution in terms of geography. The list of "Top 50 Teaching Resources" shows that the teaching resources of vocational colleges and universities in the eastern region are relatively strong, with a total of 31 institutions on the list, of which 7 are in Shandong and Guangdong, and 6 are in Jiangsu; and no institution is on the list in 11 provinces such as Guizhou, Hainan, Jilin, Inner Mongolia, Ningxia, Qinghai, Shanxi, Tibet, and Xinjiang[13] . This shows that there are obvious regional and institutional imbalances in teaching resources. In order to narrow the development level of secondary vocational education in each region, we can implement the standardization project of operating conditions of secondary vocational schools, promote the merger of secondary vocational schools, cooperation, trusteeship, and group running of schools,promote the diversified development of secondary vocational schools. being implemented"vocational education entrance exams" is a system of the number of secondary vocational schools has an important and complex impact on the development of secondary education, and it is important that, while reducing the size of these schools, they continue to improve the quality and level of their operation, so as to better serve national strategies and social needs.

Last but not the least, cultivating the real productivity of secondary vocational education and emphasizing the matching of talents with the market. The level of regional economic development has a significant impact on the attention of secondary vocational education, while the level of economic development increases, the market requirements for secondary vocational education personnel training are also increased accordingly, and secondary vocational education also has a dynamic reaction to the development of the economy. Secondary vocational education should gain inspiration from this and speed up the adjustment in order to adjust to the economy and further promote the development of the economy. First of all, secondary vocational schools should grasp the advantages, refine their specialties on the original basis, and increase the relevance of jobs, so as to reduce the retraining and time-wasting problems affecting business operation encountered by enterprises in the process of accepting students for practice. At the same time, enterprises should arrange a certain percentage of positions, accept students to practice, and schools to connect, in order to realize the integration of industry and education, promote the development of productive forces, and realize the regional economic development and secondary vocational education to promote each other.

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