

# Research on the Supporting System of Non-school Experimental Education Based on Online Discourse Volume

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## Abstract

This study aims to explore the development trends and support system of Non-school Experimental Education in Taiwan region through the analysis of online discourse volume data. The research period covers approximately five years, from December 2019 to January 2025, tracking changes in online discussion volume for four keywords: "Non-school Experimental Education," "Senior High School Self-study," "Homeschooling," and "Self-study." The study finds that Non-school Experimental Education exhibits a significant long-term upward trend ( $R^2=0.7761$ ,  $p<0.01$ ), indicating that this educational model has moved from the periphery to the mainstream and has become an important pillar of educational diversification.

Research results show that during the COVID-19 pandemic (2020-2022), the discourse volume of various self-study related topics experienced significant fluctuations. Among them, "self-study in high school" reached a peak of 1,209 in 2022, 4.5 times that of 2021; "homeschooling" also peaked at 1,032 in 2022. However, these fluctuations were driven mainly by external events and had no independent long-term growth momentum. In contrast, "non-school experimental education" remained at a relatively high level after the pandemic, with a discourse volume of 766 in 2025, reflecting the sustainability of institutional benefits and social demand.

In terms of regional distribution, the northern region (Taipei City, New Taipei City, and Taoyuan City) has the greatest attention to various self-study topics, with an average discourse volume that led the central and southern regions. This phenomenon may be related to factors such as abundant educational resources, higher parental education levels, and greater acceptance of educational innovation in the northern region. This study further analyzes the impact of factors such as the declining birth rates, pandemic-related effects, and policy adjustments on online discourse volume and proposes relevant policy recommendations.

**Keywords:** Non-school Experimental Education; Senior High School Self-study; Homeschooling; Self-study; Three-Type Acts of Experimental Education

## 1. Introduction

### 1.1. Research Background

Since Taiwan region passed the "Three-Type Acts of Experimental Education"<sup>1</sup> in 2014, non-school experimental education has gradually become an important issue in educational reform. "Three-Type Acts of Experimental Education" include the "Act for the Implementation of School-based Experimental Education," the "Act for the Delegation of Private Operation of Public Elementary and Junior High Schools," and the "Act for the Implementation of Non-school Experimental Education at the Preschool, Elementary, and Junior High School Levels," providing a legal basis for the diversified development of education in Taiwan region. The implementation of these laws has granted parents and students more diverse educational choices beyond traditional school education.

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1. Three-Type Acts of Experimental Education including "Enforcement Act for School-based Experimental" "Enforcement Act for Non-school-based Experimental Education at the High School Level and Below" "Regulations on Commissioning Private Entities to Run Public Elementary and Junior High Schools"

In recent years, with the diversification of social values, the improvement in parental educational awareness, and the impact of the declining birth rate, the number of participants in non-school experimental education has increased year by year. According to statistics from the Ministry of Education, as of 2024, the number of students participating in non-school experimental education has exceeded 10,000, covering various forms such as individual self-study, group self-study, and institution-run programs. However, there is still a lack of systematic empirical research on the social cognition, support system, and development trends of non-school experimental education.

Since 2020, the COVID-19 pandemic has had a significant impact on the global education system, and Taiwan region is no exception. During the pandemic, school closures, the popularization of online learning, and parents' concerns about the quality of education have led to a substantial rise in online discussions on such topics as "self-study" and "homeschooling." These changes provide a unique perspective for studying the development of non-school experimental education. This study attempts to gain a deeper understanding of the development trajectory and influencing factors of non-school experimental education through the analysis of online discourse volume data.

## 1.2. Research Objectives

The main objectives of this study include the following four aspects: First, to analyze the changing trends of online discourse volume for keywords related to non-school experimental education and understand its development trajectory; second, to explore the impact of external factors such as the pandemic, declining birth rate, and policy adjustments on online discourse volume; third, to analyze regional differences in the attention paid to non-school experimental education topics; fourth, to put forward policy recommendations for promoting the development of non-school experimental education based on the research findings.

## 1.3. Theoretical Framework

To overcome the original descriptive-only structure deficiency, this research constructs analytical logic grounded in three core educational sociology theories: Educational Choice Theory, Educational Diversification Theory and Diffusion of Innovations Theory, supplemented by Alternative Education Theory.

First, Educational Choice Theory focuses on families' rational decision-making in selecting educational modes based on economic condition, educational cognition and institutional supply, which explains why northern Taiwan region families with superior economic and human capital show higher willingness to engage in non-school experimental education and generate higher online discussion volume. Second, Educational Diversification Theory argues that single standardized public schooling cannot match diversified family educational demands; the promulgation of Three-Type Acts of Experimental Education breaks the monopoly of traditional formal education and legally guarantees alternative education supply, laying institutional foundation for the long-term rising trend of non-school experimental education discourse volume. Third, Diffusion of Innovations Theory explains the regional disparity of public attention: innovative non-traditional education spreads earlier among groups with higher education attainment and abundant local educational resources in northern Taiwan region, hence faster discourse diffusion and higher regional discussion heat; meanwhile, central and southern regions lag behind in innovation acceptance speed due to resource constraints. Fourth, Alternative Education Theory defines homeschooling and off-campus experimental education as important alternative forms against mainstream institutional schooling, helping distinguish differentiated development logic among four research keywords and interpret divergent post-pandemic changing trends of different self-learning patterns. The above theoretical system guides subsequent data interpretation and empirical discussion throughout this paper.

## 2. Methodology

## 2.1. Data Sources and Collection

This study uses data collected from Taiwan Public Opinion Big Data Monitoring Platform (Taiwan region), a mainstream commercial and academic shared public opinion tracking platform widely adopted in Greater China educational and sociological empirical research. This platform crawls real-time public discussion content covering mainstream news media, PTT forum, local parenting vertical communities and mainstream social networking platforms across Taiwan region's six special municipalities, with full coverage of local online educational discussion channels. The platform's data screening algorithm has been verified and cited in multiple peer-reviewed domestic and overseas educational research literatures, whose sample representativeness and data validity have been empirically confirmed by existing academic publications.

The research data tracking period spans approximately five years from December 29, 2019, to January 2025. Four keywords were selected for tracking: "Non-school Experimental Education", "Senior High School Self-study", "Homeschooling," and "Self-study". These keywords cover the main aspects of non-school experimental education, from institutional names to specific practice forms, and can comprehensively reflect the social attention to this issue.

Data were collected on a weekly basis, totaling 314 time points. Each time point records the weekly online discussion volume of the relevant keywords, including multiple sources such as news reports, social media posts, and forum discussions. The data were standardized to eliminate magnitude differences between different platforms, facilitating cross-keyword comparative analysis. In addition, the dataset includes regional distribution information, covering the discourse volume distribution of Taiwan region's six major municipalities (Taipei City, New Taipei City, Taoyuan City, Taichung City, Tainan City, Kaohsiung City).

## 2.2. Analytical Methods

This study adopts multiple analytical methods, including descriptive statistics, time series analysis, linear regression analysis, and regional comparative analysis. First, descriptive statistics are used to understand the basic characteristics of the volume of each keyword, including total volume, average volume, standard deviation, maximum value, minimum value, and coefficient of variation, etc. Second, time series analysis is applied to observe long-term trends and seasonal fluctuations in discourse volume. Third, linear regression analysis is used to test whether the long-term trend of the discourse volume of each keyword is statistically significant. Finally, regional comparison analysis is conducted to explore differences in the attention paid to non-school experimental education issue across different regions.

# 3. Results

## 3.1. Annual Discourse Volume Trend Analysis

Table 1 presents the annual discourse volume of each keyword from 2019 to 2025. Overall, the keyword "Self-study" has the highest total discourse volume (22,303), indicating that the public has the broadest attention to self-study topics. This is followed by "Senior High School Self-study" (4,349), "Non-school Experimental Education" (2,812), and "Homeschooling" (2,597). Notably, although "Non-school Experimental Education" as an institutional name has a lower total discourse volume than "self-study", its long-term trend is the most stable and significantly upward.

Figure 1 presents the annual trends in discourse volume for each keyword. It can be clearly observed from the figure that 2022 is an important turning point in the discourse volume of most keywords, with most reaching their peaks that year. This phenomenon is highly consistent with the pandemic's most severe period in Taiwan region, reflecting the pandemic's significant impact on educational choice behaviors. However, the trends for each keyword after the pandemic show clear differences: "Non-school Experimental Education" briefly declined

in 2024 and then rapidly rebounded to 766 in 2025; "Senior High School self-study" showed greater volatility, dropping sharply to 310 in 2024 and then rebounding to 1,008 in 2025.

Table 1. Annual Discourse Volume Summary of Each Keyword (2019-2025)

| Year | Non-school Experimental Education | Senior High School Self-study | Homeschooling | Self-study |
|------|-----------------------------------|-------------------------------|---------------|------------|
| 2019 | 0                                 | 0                             | 0             | 45         |
| 2020 | 211                               | 509                           | 125           | 2,915      |
| 2021 | 70                                | 266                           | 538           | 2,946      |
| 2022 | 468                               | 1,209                         | 1,032         | 4,129      |
| 2023 | 782                               | 1,047                         | 436           | 4,085      |
| 2024 | 515                               | 310                           | 355           | 4,267      |
| 2025 | 766                               | 1,008                         | 111           | 3,916      |

Data Source: Taiwan Public Opinion Big Data Monitoring Platform (Taiwan Region)

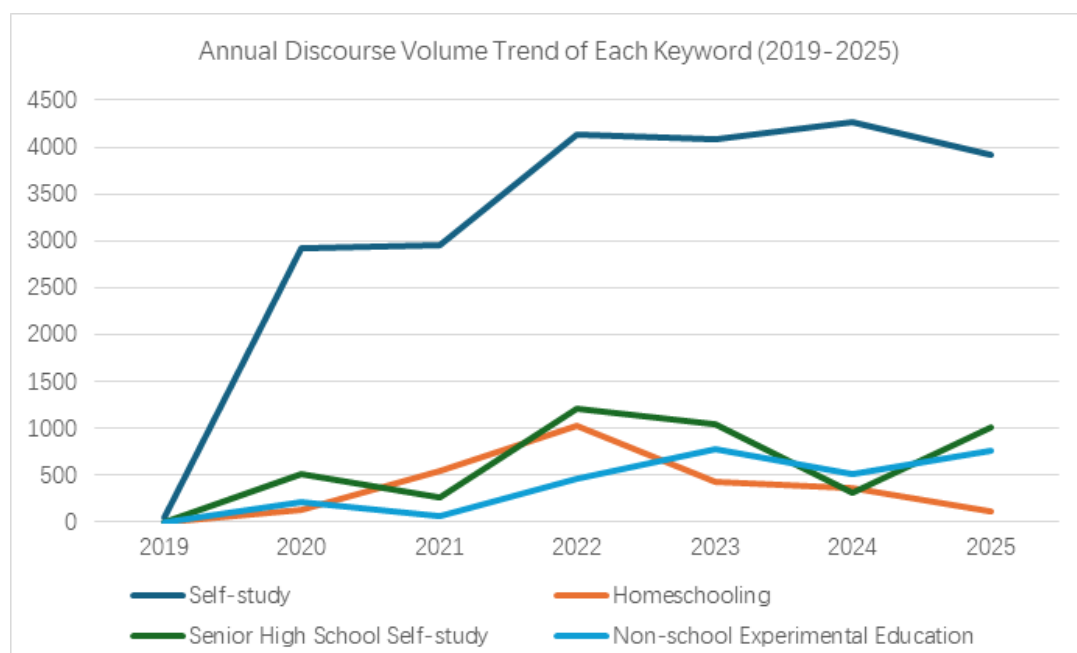


Figure 1. Annual Discourse Volume Trend of Each Keyword (2019-2025)

### 3.2. Trend Reversal Analysis

To test whether the long-term trend in the discourse volume of each keyword is statistically significant, this study uses linear regression. In all established univariate linear regression equations in this research:  $Y$  = annual cumulative discourse volume of corresponding keyword (dependent variable);  $X$  = time variable, with  $X=1$  representing year 2019,  $X=2$  for 2020, sequentially  $X=7$  for 2025 (independent continuous variable of chronological order). Table 2 presents the regression analysis results of each keyword with variable definition supplemented in table note.

The study finds that "Non-school Experimental Education" exhibits a significant long-term upward trend ( $R^2=0.7761$ ,  $p=0.0088$ ,  $p<0.01$ ), with the regression equation  $y=129.21x+14.07$ , indicating an average annual increase of approximately 129 discourse volume units. This result shows that the social attention to non-school experimental education has sustained growth momentum and is not merely driven by short-term events.

In contrast, the linear trends of "Senior High School self-study" ( $R^2=0.3194$ ,  $p=0.1861$ ) and "Homeschooling" ( $R^2=0.0232$ ,  $p=0.7444$ ) are not statistically significant, indicating that the changes in the

discourse volume of these two forms of self-study are mainly affected by external events and lack independent long-term growth momentum. The keyword "Self-study" also shows a significant upward trend ( $R^2=0.6369$ ,  $p=0.0315<0.05$ ), but this result may reflect the generality of the term "Self-study," covering various forms and contexts of self-directed learning.

Table 2. Linear Regression Analysis Results of Each Keyword

| Keyword                           | Regression Equation     | $R^2$  | p-value | Trend                  |
|-----------------------------------|-------------------------|--------|---------|------------------------|
| Non-school Experimental Education | $y = 129.21x + 14.07$   | 0.7761 | 0.0088  | Significantly Upward** |
| Senior High School Self-study     | $y = 121.68x + 256.25$  | 0.3194 | 0.1861  | No Significant Trend   |
| Homeschooling                     | $y = 24.68x + 296.96$   | 0.0232 | 0.7444  | No Significant Trend   |
| Self-study                        | $y = 552.00x + 1530.14$ | 0.6369 | 0.0315  | Significantly Upward*  |

\*Note: \* $p<0.05$ , \*\* $p<0.01$ ; Variable Definition: Y=Annual total discourse volume of specified keyword; X=time sequence variable, X=1 for 2019, X increments by 1 per subsequent calendar year

### 3.3. Regional Distribution Analysis

Figure 2 presents the distribution of discourse volume for each keyword across the six special municipalities. In terms of regional distribution, the northern region (Taipei City, New Taipei City, Taoyuan City) generally shows a higher level of attention to various self-study topics. For "non-school experimental education," Taipei City has the highest discourse volume (100), followed by Taoyuan City (99), Kaohsiung City (95), New Taipei City (89), Tainan City (87), and Taichung City (56). The average discourse volume of the three northern cities is 96, significantly higher than that of the central region (56) and the southern region (91).

This phenomenon may be related to the following factors: First, the northern region has abundant educational resources, and parents have a higher acceptance of educational innovation; second, parents in the northern region generally have higher education levels and a deeper understanding of non-traditional educational models; third, there are more experimental education institutions in the northern region, providing more diverse choices. It is worth noting that Kaohsiung City ranks fourth in the discourse volume of "non-school experimental education" but has a relatively low discourse volume in "homeschooling," indicating that different regions have varying degrees of attention to different forms of self-study.

The heat map in Figure 3 further shows differences in the distribution of discourse volume for each keyword across the six special municipalities. From the heat map, it can be observed that the keyword "self-study" has the highest discourse volume in Tainan City (100), while "senior high school self-study" is highest in Taoyuan City (100). This difference reflects the varying focus of attention on self-study learning topics in different regions: Tainan City may pay more attention to general self-study learning topics, while Taoyuan City focuses more on self-study learning at the senior high school level.

### 3.4. Monthly Trend and Fluctuation Analysis

Figure 4 presents the monthly discourse volume trend of each keyword (4-week moving average). It can be observed from the figure that the discourse volume of each keyword exhibits obvious fluctuation characteristics, with significant differences in fluctuation amplitude. The keyword's discourse volume "self-study" is the most stable, with a coefficient of variation of only 19.15%, indicating that social attention to self-study learning topics is relatively stable. In contrast, the coefficient of variation for "homeschooling" is as high as 268.97%; that for "non-school experimental education" is 262.36%; and that for "senior high school self-study" is 208.55%, indicating that the discourse volume of these keywords is strongly affected by external events.

Figure 5 presents a comparison of the average discourse volume of each keyword in the northern, central, and southern regions. From the figure, the northern region has the highest average discourse volume across all

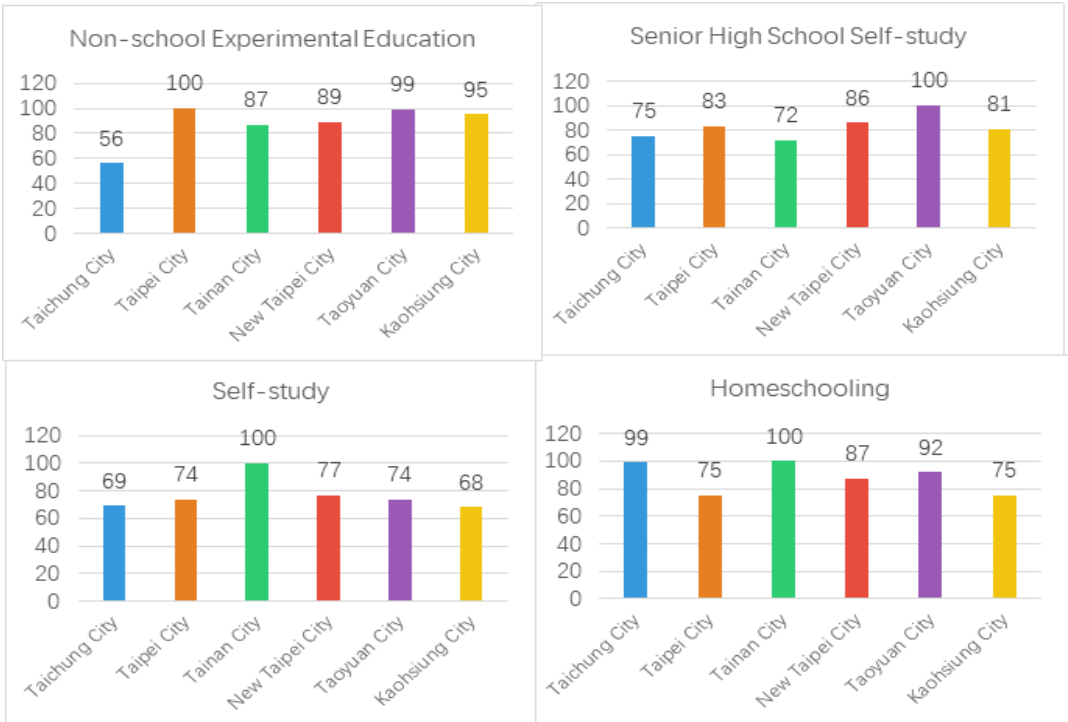


Figure 2. Comparison of Regional Discourse Volume Distribution for Each Keyword

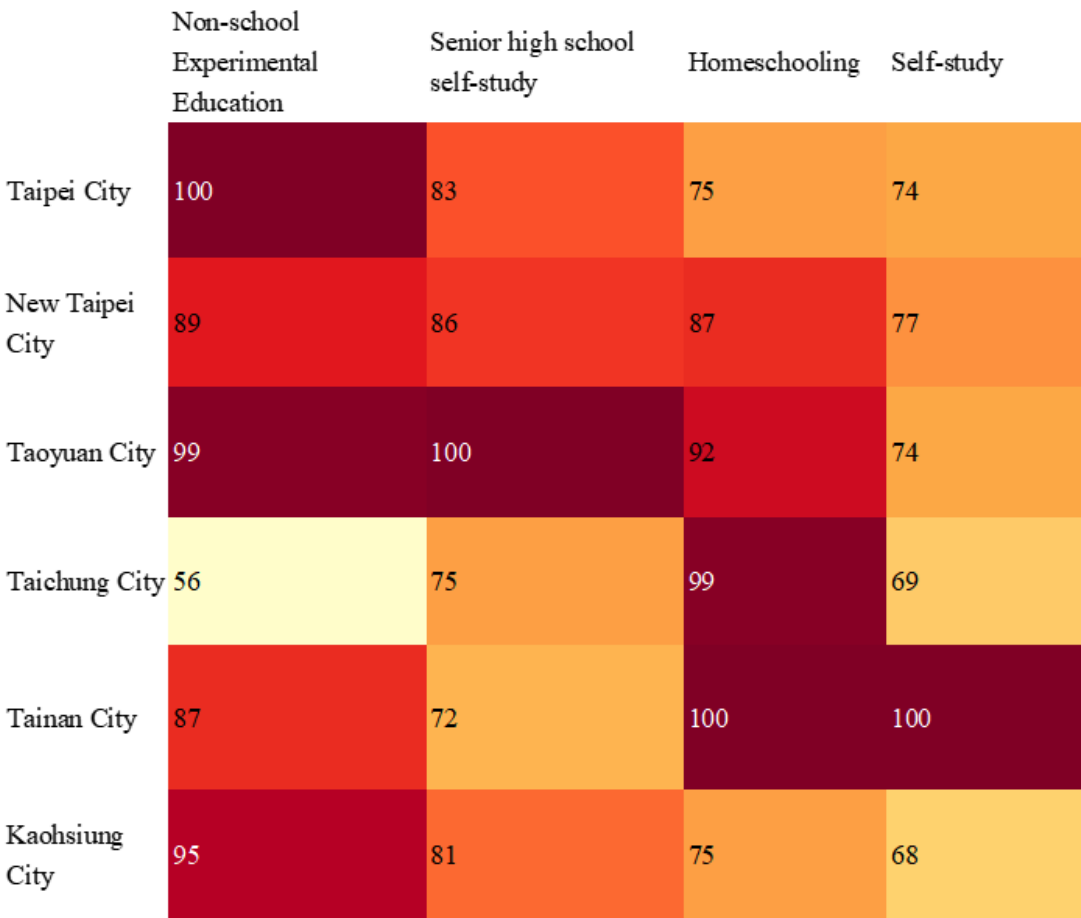


Figure 3. Heatmap of Keyword Discourse Volume in the Six Special Municipalities

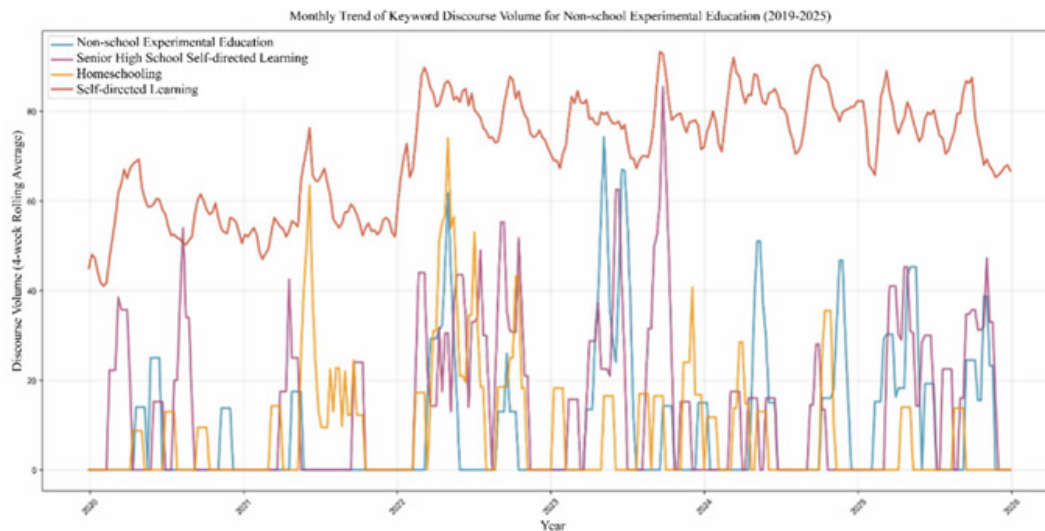


Figure 4. Monthly Trend of Each Keyword Discourse Volume (2019-2025,4-week Rolling Average)

keywords, followed by the southern region, and the central region has the lowest. This result is consistent with the aforementioned regional distribution analysis, further confirming the existence of regional differences. Notably, the average discourse volume of "homeschooling" in the central region (99) is higher than that in the northern region (84.67) and the southern region (87.5), indicating that the central region has a relatively higher level of attention to the issue of homeschooling. Combined with Alternative Education Theory, this special regional feature reflects localized differentiated demand for alternative education amid uneven regional educational resource allocation.

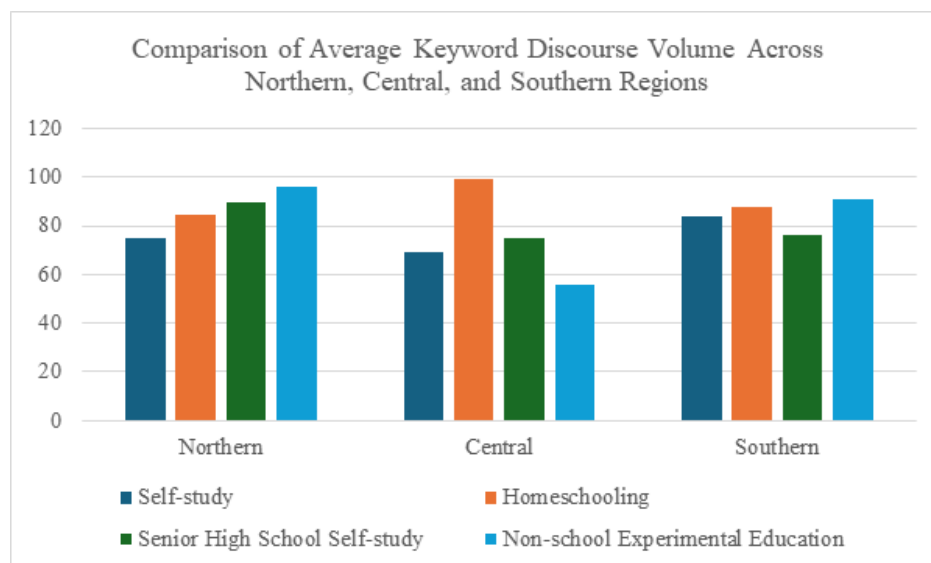


Figure 5. Comparison of Average Keyword Discourse Volume Across Northern, Central, and Southern Regions

## 4. Discussion

### 4.1. The Impact of the Pandemic on Self-study Discourse Volume

The study finds that the COVID-19 pandemic had a significant impact on the online discourse volume of various self-study topics. 2022 was the most severe period of the pandemic in Taiwan region, and the discourse volume of all keywords reached their peaks in this year. This phenomenon can be interpreted from two

perspectives: first, school closures during the pandemic forced many families to rethink educational choices, and some parents began to explore the possibility of self-study; second, the popularization of online learning greatly increased the discussion on "self-directed learning" related topics.

However, the trends of each keyword after the pandemic show obvious differences. "Non-school Experimental Education" remained at a relatively high level after the pandemic, with a discourse volume of 766 in 2025, indicating that this educational model has transformed from an "emergency choice" during the pandemic to a "long-term choice" for some families. In contrast, "Homeschooling" declined rapidly after the pandemic, with a discourse volume of only 111 in 2025, close to the pre-pandemic level. This result shows that homeschooling has extremely high requirements for family resources (time, educational ability, economic conditions), and most families find it difficult to maintain it in the long term, thus declining rapidly after the pandemic.

#### 4.2. The Impact of Declining Birthrate on Educational Choices

The declining birthrate is the most fundamental and long-lasting structural challenge facing Taiwan region's education system. According to statistics from the Ministry of Education, the number of applicants for Taiwan region's senior high school entrance examination in 2025 was only 175,200, a record low. The impact of the declining birthrate on non-school experimental education is dual: on the one hand, the continuous shrinking of student sources has led to relatively abundant resources in traditional schools, reducing the motivation for families to choose self-study; on the other hand, the declining birthrate has also prompted parents to pay more attention to the quality of their children's education, and some families have turned to more flexible non-school experimental education.

Research data show that the discourse volume of "non-school experimental education" still shows an upward trend against the backdrop of the declining birthrate, indicating that this educational model has a certain degree of resilience. This phenomenon may be related to the following factors: first, the declining birthrate has led to school closures of some school and a reduction in education resource contraction, making some parents doubt the quality of traditional school education; second, against the backdrop of the declining birthrate, parents have increased their investment in their children's education and are more willing to explore diversified educational choices; third, the implementation of Three-Type Acts of Experimental Education has provided institutional guarantee for non-school experimental education, reducing the choice risk for parents.

#### 4.3. The Underlying Causes of Regional Differences

The study finds that the northern region generally shows higher attention to various self-study topics, which may be related to the following factors. First, the northern region has abundant educational resources and a large number of experimental education institutions, providing more diverse options. Second, parents in the northern region generally have higher education levels and a deeper understanding of non-traditional educational models, resulting in a relatively lower threshold for choosing self-study. Third, the economic conditions in the northern region are better, and families are more capable of bearing the economic costs required for self-study.

It is noteworthy that the central region has a relatively high discourse volume in "Homeschooling," which is worthy of further exploration. Possible reasons include: the relatively small number of experimental education institutions in the central region, making parents more inclined to choose homeschooling; the lower cost of living in the central region, allowing parents to have more time and resources to invest in their children's education; and the strong community support network in the central region, enabling homeschooling families to obtain more social support.

#### 4.4. Differences in the Development Trajectories of Different Forms of Self-study

The study finds that there are significant differences in the development trajectories of different forms of self-directed learning. "Non-school Experimental Education" exhibits a significant long-term upward trend,

indicating that this educational model has moved from the periphery to the mainstream and become an important pillar of educational diversification. This phenomenon is closely related to the implementation of Three-Type Acts of Experimental Education, and institutional guarantee has provided a stable foundation for the development of non-school experimental education.

The sharp increase in the discourse volume of "senior high school self-directed learning" during the pandemic is closely related to the surge in online learning demand during that period. In contrast, "Homeschooling" has extremely high requirements for family resources, and most families find it difficult to maintain it in the long term, thus declining rapidly after the pandemic. These results show that the development of different forms of self-study is driven by different factors and requires differentiated policy support.

## 5. Conclusions and Policy Suggestions

### 5.1. Research Conclusions

Through analysis of online discourse volume data, this study explores the development trends and support system of non-school experimental education in Taiwan region. The main conclusions drawn from the research are as follows:

(1) Non-school experimental education exhibits a significant long-term upward trend ( $R^2=0.7761$ ,  $p<0.01$ ), indicating that this educational model has moved from the periphery to the mainstream and become an important pillar of educational diversification. Institutional guarantee (Three-Type Acts of Experimental Education) and the sustainability of social demand are the main driving forces for its development.

(2) The COVID-19 pandemic had a significant impact on the online discourse volume of various self-study topics, and the discourse volume of all keywords reached their peaks in 2022. However, the trends of each keyword after the pandemic show obvious differences, indicating that the development of different forms of self-study is driven by different factors.

(3) The discourse volume of "Senior High School Self-study" and "Homeschooling" fluctuates greatly, lacking independent long-term growth momentum, and is mainly driven by external events (such as the pandemic and policy adjustments). These forms of self-study have high requirements for family resources and require more policy support.

(4) Regional differences are significant, with the northern region generally showing higher attention to various self-directed learning topics, which may be related to factors such as educational resources, parental education levels, and economic conditions. The central region has a relatively higher discourse volume in "Homeschooling," which is worthy of further exploration.

### 5.2. Policy Recommendations

Based on the research findings, this study puts forward the following policy recommendations:

(1) Strengthen the support system for non-school experimental education: The government should continue to improve the supporting measures of Three-Type Acts of Experimental Education, including teacher training, curriculum resources, and evaluation mechanisms, to provide more comprehensive support for families choosing non-school experimental education.

(2) Narrow regional gaps: For the central and southern regions, the government should increase the establishment of experimental education institutions and improve the accessibility of non-school experimental education.

(3) Establish a social support network for self-study families: The government should assist in establishing a community network for self-directed learning families, promote experience sharing and resource exchange, and reduce the sense of isolation and burden of self-directed learning families.

(4) Continuous monitoring and research: The government should establish a long-term online discourse volume monitoring mechanism to track the development trends of non-school experimental education and adjust policy directions based on data analysis results.

### 5.3. Research Limitations and Future Directions

This study has the following limitations: first, online discourse volume data only reflect social attention and cannot directly infer the actual number of participants or educational quality; second, the data sources are mainly from online platforms, which may ignore groups not using the Internet; third, the research period covers the special period of the pandemic, and some conclusions may not be applicable to normal situations. Future research can combine questionnaire surveys, in-depth interviews, and other methods to gain an in-depth understanding of the actual needs and dilemmas of self-study learning families; cross-country comparative research can also be conducted to explore the development experience of non-school experimental education in different countries.

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