

Restricting Factors of English Basic Education Reform Based on Big Data

Xiaoying Liu

Inner Mongolia Transportation Vocational and Technical College

Keywords: Big Data; Basic English Education; Educational Reform; Restricting Factors

Abstract: The development of computer science and technology since the 21st century indicates that the era of big data is coming or even has come, and big data has been widely deployed in all walks of life. The same is true in the field of education. The "Internet + Education" integration mode has been widely permeated into daily teaching, and educators have a more advanced understanding of the value and significance of teaching. In this process, due to the characteristics of the era of big data, the teaching of various subjects must make necessary reforms in order to conform to the trend of The Times, continuously develop and make progress, and promote the significant improvement of teaching level. The era of big data heralds the arrival of the information age of education and the historic opportunities and challenges of teaching reform. In the teaching of English subject, big data can be used to accurately analyze the current situation of English teaching and formulate the optimal teaching plan. This article will also from large data in the reform of basic education of English study, and emphatically discusses the era of big data, basic English education reform direction and the restricting factors of informationization teaching reform essentials and find English education big data in the application of basic English teaching method, and discusses the reform of the specific implementation measures.

1. Introduction

In the context of the era of big data, all data bring us quantitative advantages in learning knowledge, and also provide infinite space for creation [1]. The development of information technology and the application of big data are powerful catalysts for the reform of English basic education, which is the continuous evolution and promotion of English basic education in such a data system [2]. The educational resources of big data are a kind of invisible information assets, from which the essence and law of education can be explored, and diversified educational information can be presented in digital form [3-4]. The adoption of big data analysis can accurately grasp the diversity and complexity of education and teaching models, and avoid the theoretical framework of ecology of education, so that the large and multi-format education data are relatively consistent with the accumulated and diverse data of English basic education [5-6]. In addition, the reform of English teaching with the help of big data information service is also conducive to solving the difficult problem of integrating the overall information of education [7].

The reform plan of English basic education has always been the focus and hotspot of English experts at home and abroad, and the construction of English basic education information system based on big data has also become a research hotspot [8]. Foreign researchers tend to study the relationship between English learners' personal behaviors and English education environment, trying to find the balance between multiple factors and multiple factors [9]. For example, some scholars in the United States proposed the concept of classroom ecology, pointing out that school itself is a complex cultural system with multi-factor and systematic characteristics, and further explaining the dynamic correlation between multi-factor can further refine the information system classification of linguistics education [10-11]. The reform of basic English teaching in China is full of uncertainties and challenges due to the arrival of the era of big data, but scholars in this field also believe that it is an opportunity [12]. Therefore, although the research on the ecology of English education in China started late, the research behavior is very active and the research results are quite rich [13]. For example, some scholars combine the theory of education ecology with the educational situation in Taiwan, holding that the educational ecosystem involves natural factors such as

classroom teaching, school distribution and population density, and put forward the strategic slogan of sustainable development of education. Some scholars also make in-depth analysis of specific cases in English teaching by using the research methods of ecology, explain the phenomenon of education ecology from the perspective of classroom ecological environment and ecological foreign language teaching, and put forward the methods and ideas of English basic education reform from the perspective of humanism [14-15].

Based on the analysis of big data, this paper adopts the estimation method of random forest model to apply GEE big data analysis platform to the research of English basic education reform. It can be seen from R², RMSE and other indicators that the estimation method of random forest model can give full play to its estimation ability in big data analysis, and the estimation effect is significantly better than the traditional process estimation model [16]. With the help of GEE big data analysis platform, analyzing the restrictive factors in the process of English basic education reform can fully explore the mechanism of action and internal laws among various factors, and the proposed strategies on this basis are more conducive to the development of a dynamic English basic education reform plan.

2. Method

2.1 GEE Big Data Analysis Platform

GEE big data analysis platform is a data processing tool under the famous Google company, which is affiliated to a series of tools of Google Earth. Compared with ENVI, a traditional data analysis and processing tool, the gee-structured analysis platform can generate large volumes of data in bulk and more quickly. The platform can quickly predict crop yield, NDVI and other vegetation index and monitor other changes.

GEE big data analysis platform is a cloud-based platform that enables users to easily access large spatial data sets without facing complex computer principles. Users can also through the web-based interactive development environment to control and access of GEE analysis platform, through the Internet to access the program into the interface for the execution of the operation, these were made by Google implemented in a parallel processing system, the automatic calculation and distribution segment, providing high throughput and analysis ability, so as to realize rapid model design and data visualization, users and efficient access to large amounts of data system.

2.2 Stochastic Forest Model Estimation Method

Random forest model belongs to random forest regression algorithm, which is a relatively mature machine learning algorithm. It can not only predict the regression of data, but also complete the classification of data and realize the estimation of GPP, so it has a very wide range of applications. After model tuning and model training, the established model is used to predict the data of the test group, and the real value of the comparative test data is used to estimate the test effect of the model based on related accuracy indicators such as RMSE and R².

Random forest algorithm is applied in big data processing. Due to the huge volume of data, a large number of decision trees will be generated, and all the decision trees are unrelated. When the decision trees are regressed, the random forest model will output the average value given by these decision trees. When objects need to be classified according to attributes, each decision tree in the random forest will make judgment on these massive data and finally output the classification option that has been selected the most times.

The main ideas of regression modeling are as follows: first, Bootstrap sampling method is adopted to obtain randomly sampled sample data from the data set, which can be marked as k . Secondly, the data of the original training set are collectively labeled. Then, the regression model $h_i(x)$ of decision tree was established for each subset. After training, the complete regression tree sequence is obtained. For any given new sample, its prediction result is the average summary of k results, expressed as:

$$f_r(x) = \frac{1}{k} \sum_{i=1}^k h_i(x) \quad (1)$$

Where, $h_i(x)$ is the result of a single regression tree model, and $f_r(x)$ is the result of a random forest regression model.

In this study, we divided the collected data into the test group and the training group, took R2 as the evaluation index, used the data of the training group to establish the English learning model, through the method of cross-validation, and conducted one-to-one training to select the optimal model parameters, so as to obtain the ideal regression results.

3. Experiment

3.1 Selection of Impact Factors

The research of this paper is to analysis and study of basic education reform of English restricting factors, in order to make the GPP true, accurate and valid data in a regression model, we selected the restriction of reform of English quality education guiding ideology, highlight the decision-making of cultivating the ability of listening, college English teachers' knowledge structure, the prosperity of all kinds of English test, basic English teaching as impact factors, the benefit of group composition training set, and trained factor model to analyze the data.

3.2 Model Selection and Research Steps

Since the relationship between GPP and background data is complex and does not belong to linear correlation, it is difficult to choose linear regression model. However, the regression model of random forest has a strong generalization ability, which can deal with high-dimensional data without feature selection, and can also maintain the accuracy of abnormal or missing individual data. Therefore, we choose the random forest model as the experimental model.

Since the factors restricting the reform of basic English teaching are various and complex, after selecting the influence factors of the model, it is necessary to first obtain the background data by using the platform of GEE big data analysis, and then filter and organize the combined data set according to the specific situation in practice. The relationship model between dependent variables and independent variables was established through the data of the learning and training group, and then the independent variables of the test group were input into the model for prediction.

4. Discuss

4.1 Model Regression Results

To restrict the English level of the reform of the education guiding ideology (guidelines), prominent decision (hearing) of cultivating the ability of listening, college English teachers' knowledge structure, faculty structure), the prosperity of all kinds of English tests, examination system, the basic English teaching benefit group five factors (interest) after training, the important feature of the model to get the preliminary, the role of shadow factor analysis results are shown in figure 1 below.

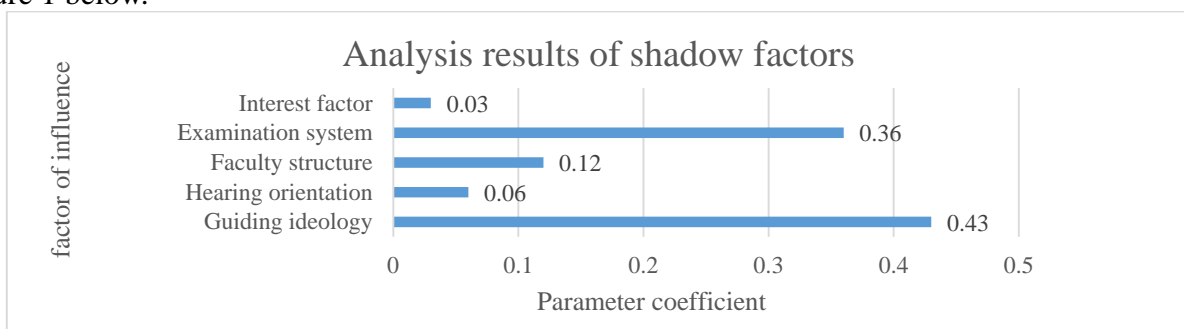


Figure 1. Analysis results of shadow factors

The analysis results show that the guiding ideology of English quality-oriented education is the most influential factor to the GPP, followed by the examination system, teacher structure, listening orientation and benefit factors. Later studies showed that when RMSE indicators were not taken into account, the influence of teacher structure on the results would be greatly increased, while when R2 indicators were not taken into account, the impact of examination system on the results accounted for a large proportion.

In order to obtain more accurate analysis results, the parameter model needs to be adjusted. The parameters of the random forest model mainly include maximum feature number, maximum depth and maximum iteration times. In RMSE and R2, the reference value of RMSE is 1.132, which is relatively small, indicating that the simulation results are more reliable. The closer the R2 value is to 1, the more accurate the prediction effect is and the higher the correlation is. The results of tuning and the measured data of the forest model are shown in table 1 below.

Table 1. Results of tuning and measured data of forest model

Para_n_estimators	Mean_test_score	Mean_train_score	Rank_test_score	RMSE	R2
10	3.05	0.22	10	1.263	0.892
20	2.81	0.18	9	1.174	0.995
30	2.72	0.17	8	1.162	0.993
40	2.66	0.15	7	1.246	1.006
50	2.69	0.15	6	1.146	1.014
60	2.63	0.15	5	1.157	0.984
70	2.61	0.14	4	1.118	1.062
80	2.59	0.17	3	1.146	0.989
90	2.63	0.19	2	1.137	1.102
100	2.63	0.15	1	1.102	1.073

After 100 iterations and 10 cross validations, the mean value of RMSE and R2 of the model was 1.165 and 1.011, respectively. The results show that the simulation results are reliable and accurate.

4.2 Analysis of Constraints

The above research shows that the main factors restricting the reform of basic English education include the following two aspects:

(1) Constraints of objective conditions

Guiding ideology, textbook compilation and examination system are the three main objective restricting factors.

For a long time, China has been influenced by Confucianism, which emphasizes the collective concept, which forms a sharp contrast with the western culture which puts forward the theory of communicative competence. In this context, the compilation of textbooks in practice also difficult to have a breakthrough in the reform; Examinations are also an important factor in determining classroom activities, because teachers often take examinations as the only benchmark for judging students' life choices. Under the influence of these objective factors, English teaching reform will inevitably affect the smooth progress.

(2) Constraints of subjective conditions

The decision on the cultivation of listening ability and the knowledge structure of college English teachers are two subjective constraints.

Through the survey, we found that the older teachers not only showed more resistance to the reform, but also often doubted the role of the reform. It can be seen that their knowledge structure was difficult to contact with the background of the era based on the reform. In terms of training objectives, we also found that many schools emphasize the ability to focus on reading and writing, which is no doubt closed the door to improve students' listening and speaking ability.

5. Conclusion

The reform of English basic education is restricted by many factors and involves a wide range of factors. Based on the analysis of these factors in the process of using the big GEE data analysis data analysis platform, using the random forest model estimation method, points out the guiding ideology of English quality education, highlight the decision-making of cultivating the ability of listening, college English teachers' knowledge structure, the prosperity of all kinds of English test, basic English teaching for the benefit of group five key factor in affecting the reform of basic education of English. From the perspective of medium and long term, the reform of basic English education in China is inevitable on the whole. To this end, we should not only make actions for the analysis of factors, but more importantly, try to solve these constraints on the reform.

References

- [1] Gao Ran. An Experiment of Formalizing Popular Education: The Reform of Public Basic Education in So Paulo,1991-2016[J]. *Journal of Latin American Studies*, 2017, 53(327):5-9.
- [2] MILI. Pedagogical Reform in Indian School Education: Examining the Child entred Approach[J]. *Journal of Philosophy of Education*, 2019, 116(634):537-574.
- [3] Wei Zhang, Bing-Yi Wang, Xiao-Yan Du. Big-data analysis: A clinical pathway on endoscopic retrograde cholangiopancreatography for common bile duct stones[J]. *World Journal of Gastroenterology*, 2019, 25(8):1002-1011.
- [4] Kevin R Talley, Sage R Bauers, Celeste L Melamed. COMBIgor: Data-Analysis Package for Combinatorial Materials Science[J]. *ACS Combinatorial Science*, 2019, 21(7):102-114.
- [5] Matteo Cremonesi, Claudio Bellini, Bianny Bian. Using Big Data Technologies for HEP Analysis[J]. *The European Physical Journal Conferences*, 2019, 214(437):60-70.
- [6] LI Xiongying, LENG Wenjun, SUN Yanchao. Comprehensive Evaluation:A New Orientation of the Reform of the College Entrance Examination[J]. *Journal of Higher Education Management*, 2018, 174(537):841-846.
- [7] Weichang Kong, Fei Qiao, Qidi Wu. Real-manufacturing-oriented big data analysis and data value evaluation with domain knowledge[J]. *Computational Statistics*, 2019, 65(2):1-24.
- [8] ZHANG Ting, TANG Jingli, Deptof Aviation Engin. Reform of P.E.Curriculum for Basic Education in China[J]. *Journal of Physical Education*, 2017, 93(13):6-14.
- [9] Qian, Yingyi. How Reform Worked in China: The Transition from Plan to Market[J]. *Mit Press Books*, 2017, 1(4):1072-1094.
- [10] YANG Zhian, FAN Honghui, ZHAO Meng. Case Analysis of Effectiveness Evaluation for Comprehensive Reform in Local Colleges of Undergraduate Education——A Case Study of Accounting Majors of T College[J]. *Journal of Higher Education*, 2018, 297(737):71-89.
- [11] Linda P. Blanton, Mildred Boveda, Lorena R. Munoz. The Affordances and Constraints of Special Education Initial Teacher Licensure Policy for Teacher Preparation[J]. *Teacher Education & Special Education the Journal of the Teacher Education Division of the Council for Exceptional Children*, 2018, 40(1):327-339.
- [12] SHI Jinghuan, JO Lyeong, HU Maobo. The Dynamics and Macro Strategy of Structural Reform in Higher Education in China: Case Study of Two Critical Periods (1949–1960 and 2002–2017)[J]. *Frontiers of Education in China*, 2018, 13(2):31-45.
- [13] Sale T, Levin B. Problems in the Reform of Educational Finance: A Case Study.[J]. *Reflection on the Comprehensive Reform of Higher Education*, 2017, 16(1):32-46.
- [14] ZHOU Qi-jun, WANG xin, Automobile Sergeant School. Practical Teaching Reform of

“Review on the comprehensive training of the basic management ability of the Automobile Sergeant”:A Case Study of Automobile Division Management Course[J]. Journal of Higher Education Research, 2018, 19(428):552-576.

[15] HE Xuexin, YANG Danzi. The Indian Basic Education Curriculum Reform in the New Century and Its Enlightenment[J]. Journal of Teacher Education, 2017, 1429(748):2572-2585.

[16] ZENG Hui-juan, LI Bo-wei. A Study on the Relationship between “Five Development Concepts” and the Reform and Development of Colleges and Universities[J]. Journal of Higher Education Finance, 2017, 792(436):35-51.