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# The Creation of a Management Evaluation System for Chinese International Education Based on Logistic Regression Model

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***Abstract***

*Under the background of the rapid development of big data technology, the issue of how to use big data technology and the integration of Chinese international education has become a hot topic of current social concern. Firstly, the XGBoost-Logistic combination model is optimized based on pos algorithm, and firstly, the requirement analysis is carried out through the evaluation system of Chinese international education. The five modules are mainly analyzed: login module, basic data management, evaluation module, comprehensive statistics and system management. Then by dividing the original data into three aspects, specifically teacher evaluation, expert evaluation and student evaluation, according to the data and establish the evaluation index system, the evaluation index includes 3 primary indexes, 9 secondary indexes and 24 tertiary indexes. The evaluation index system was used as the evaluation standard, and finally the accuracy rate analysis was conducted on the secondary and tertiary indicators of Chinese international education evaluation based on the logistic regression model, XGBoost model and combined logistic-XGBoost model. The results show that:In the XGBoost-Logistics model, the accuracy rates of all indicators are maintained in the range of 83.71%~91.39%, and the accuracy rate of D13 indicators is the highest among all indicators, with an average accuracy rate of 87.81%. In general, the accuracy of the combined XGBoost-Logistics model performed better than the other two models. By creating an evaluation system for Chinese language international education management, this study improves the efficiency and accuracy of education management, which is historically important for the international communication and dissemination of Chinese language.*

***Keywords:*** *Big Data Technology, Logistic Regression Model, XGBoost Model, Chinese International Education, Management Evaluation System.*

## Introduction

In the traditional offline teaching mode, teachers of Chinese as a foreign language have to assist students' understanding of the teaching content through linguistic descriptions (I, 2019; X.-L. L, 2019). Students generally understand only about 60% of what the teacher says when they first study. When it comes to cultural courses, because of the profoundness of Chinese culture, teachers cannot present the richness of the culture to students with a single language description, and students' imagination is beyond the teachers' control, which may lead to the phenomenon that teachers introduce a lot of culture but students do not understand it thoroughly. This can be remedied by online teaching (H, 2019; Mei, 2022). With the help of richer resources and more diversified forms, online teaching establishes the connection between inside and outside the

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classroom, so that students' cultural knowledge can be further expanded and enriched, allowing them to experience the sense of impact brought by the real cultural environment in the classroom and making the learned knowledge more lifelike, realistic, three-dimensional and detailed (Li, 2019; X, 2016).

Online teaching mode will remain the main teaching form of Chinese international education for a long time in the future. Then, how to make full use of the advantages of online teaching and ensure the quality of online education becomes a more important and worthy of research (Q, 2013; Z, 2014). In the classroom teaching process of international Chinese education, especially at the elementary level, teachers usually help students understand and remember the knowledge points with the help of a lot of explanations and exercises, therefore, it is very important for teachers to present the teaching contents in a visual and intuitive way (J, 2018; Wang & Kuo, 2016).

The literature (T, 2019) addresses the process of value judgment on the merits of Chinese digital teaching materials. According to the evaluation subject can be divided into expert evaluation, user evaluation, manager evaluation and machine evaluation. According to the evaluation purpose, it can be divided into formative evaluation and summative evaluation, etc. The evaluation of international Chinese digital teaching resources should follow the principles of relevance, comprehensiveness, accuracy and operability, and different methods such as qualitative evaluation, quantitative evaluation or combined qualitative and quantitative evaluation can be used. The literature (Y. L, 2018) has sorted out the linguistic foundational implications of multimodal discourse analysis theory for international Chinese language teaching. From the perspective of Digital Bloom, the literature (Wei L 2016) firstly composes the components of international Chinese distance learning activities from the existing research related to the design of online learning activities; then proposes a systematic framework for the design process of international Chinese online learning activities based on the comprehensive consideration of international Chinese learning content and distance learners' characteristics; finally, the implementation effect of international Chinese online learning activities designed under the framework is examined. Finally, the implementation effects of the international Chinese online learning activities designed under this framework are examined in order to provide an effective theoretical guide and reference case for the design of international Chinese online learning activities in the digital learning environment.

The literature (L. L, 2015) explored the operational procedures and conditions for applying the flipped classroom teaching model to international Chinese language teaching. The author divided the operation procedure of the flipped classroom teaching model into three parts: before class, during class and after class, which includes six processes: analysis of learning contents, analysis of learning objectives, analysis of learners' characteristics, design of pre-class activities, design of in-class activities and reflection on teaching design. The most favorable conditions to support the implementation of the flipped classroom teaching model are described mainly in terms of teacher

and student roles and teaching tools. The literature (Shu, 2015) discusses the construction and application of an international corpus of Chinese teaching materials. It examines the contribution of the corpus to the study of Chinese language teaching and acquisition in terms of the development of textbook standards, the assessment and difficulty measurement of textbooks, and the development and application of assessment software in conjunction with specific research and development results.

In this paper, we first optimize the XGBoost-Logistic combination model based on pos algorithm, and propose the system design framework and ideas from the evaluation requirements of the evaluation system, analyze the requirements and functions of the education management system, mainly around students, schools and parents. Then the evaluation system is designed and the education management evaluation indexes are constructed. According to the national education training objectives, the evaluation indexes are divided into 3 primary indexes, 9 secondary indexes and 24 tertiary indexes. Finally, learners of Chinese language education in colleges and universities are used as the research objects, and the data are analyzed by using the logistic model. This study provides a comprehensive and accurate education management analysis for users, and the system can arrange targeted learning methods and contents according to the feedback data, thus realizing artificial intelligence management and humanized learning methods for Chinese international education.

## Chinese International Education Management Evaluation Model

### *Logistic regression model*

Suppose that in Chinese education management, there is $n$ user, $X=\left(x_1,x_2,\cdots,x_m\right)$ a characteristic variable that affects Chinese international education management, $m$ the number of variables, and the Chinese international education management system gives each customer a label $y$ (dependent variable) according to the user's educational performance, where $y$ indicates whether the customer's educational performance is normal or not as a dichotomous variable (i.e., 0 means "good educational performance" and 1 means "poor educational performance"). " and 1 means "poor performance in education"). To evaluate whether a user has received Chinese education as normal Chinese communication, we need to calculate the probability of the predicted outcome of the model as $y=1$, which can be expressed as $p=f\left(y=1|x_1,x_2,\cdots,x_m\right)$, and the specific expression is:

$$\log it\left(p\right)=\ln\frac{p\left(y=1\right)}{1-p\left(y=1\right)}=\beta_0+\beta_1x_1+\beta_2x_2+\cdots+\beta_mx_m \quad (1)$$

$$p(y=1)=1-\frac{1}{1+\exp(\beta_0+\beta_1 x_1+\cdots+\beta_m x_m)} \tag{2}$$

In the above equation $(\beta_0,\beta_1,\beta_2,\cdots,\beta_m)$ is the coefficient to be determined for the model.

The great likelihood estimation method is used to solve the coefficients to be determined in equation (1), from which the evaluation probability of the user's performance in receiving Chinese language education in the Chinese international education management evaluation system can be found according to equation (2).

$$p(y=1|X)=1-\frac{1}{1+\exp(\beta_0+\beta_1 x_1+\beta_2 x_2+\cdots+\beta_m x_m)}=\pi \tag{3}$$

$$p(y=0|X)=1-\pi \tag{4}$$

The probability functions of $y$ can be combined as :

$$p(y_i)=\pi^{y_i}(1-\pi)^{y_i},\ y_i=0,1;i=1,2,\cdots,n \tag{5}$$

Based on the Bernoulli distribution, the maximum likelihood function can be written as :

$$l(\beta;X)=\prod_{i=1}^{n}p(y_i)=\prod_{i=1}^{n}\pi_i^{y_i}(1-\pi_i)^{1-y_i} \tag{6}$$

Then the log-likelihood function is :

$$\begin{aligned}\ln(l(\beta;X))&=\sum_{i=1}^{n}\left[y_i\ln\pi_i+(1-y_i)\ln(1-\pi_i)\right]\\&=\sum_{i=1}^{n}\left[y_i\ln\frac{\pi_i}{1-\pi_i}+\ln(1-\pi_i)\right]\end{aligned} \tag{7}$$

For logistic regression, equation (3) is brought into equation (7) to obtain equation (8):

$$\begin{aligned}\ln(l(\beta;X))=\sum_{i=1}^{n}\{&y_i(\beta_0+\beta_1 x_{11}+\beta_2 x_{12}+\cdots\beta_m x_m)\\&-\ln\left[1+\exp(\beta_0+\beta_1 x_{i1}+\beta_2 x_{i2}+\cdots+\beta_m x_m)\right]\}\end{aligned} \tag{8}$$

Equation (8) for the first-order derivative of the coefficients to be $\beta_0,\beta_1,\beta_2,\cdots,\beta_m$ and make

it equal to zero, respectively, can be solved for all the parameters to be solved in the system of equations.

***XGBoost model***

The essence of XGBoost is inherited from decision trees, and thus the model can be written as :

$$y_i = \sum_{k=1}^{K} f_k(X_i),\ f_k \in F \tag{9}$$

In the above equation, $K$ is the $i$ input sample, $y_i$ represents the predicted value of the model after the $k$ iteration, $f_k(X_i)$ represents the predicted value of the $k$ tree, and $F$ is the set of all decision trees. In the model, the objective optimization function is defined as shown in Equation (10):

$$Obj(\theta) = L(\theta) + \sum_{k=1}^{K} \Omega(f_k) \tag{10}$$

Among them:

$$L(\theta) = \sum_{i=1}^{n} l(y_i, y_i) \tag{11}$$

$$\Omega(f) = \gamma T + \frac{1}{2}\lambda \|\mu\|^2 \tag{12}$$

In Equation (12), $L(\theta)$ represents the loss function for the fit of the XGBoost model, $y_i$ represents the true class label of the sample, and $y_i$ represents the predicted value of the sample. $\Omega$ denotes the regularization term added to the model to handle the complexity of the model. In Equation (12), $T$ is the number of leaf nodes in each tree, $\lambda$ is the penalty factor, and $\mu$ is the set of scores of leaf nodes in each tree.

## Combined XGBoost-Logistic model based on PSO algorithm

Figure 1 shows the construction principle of the combined XGBoost-Logistic model. Finally, XGBoost and Logistic regression were selected, in which XGBoost model has high classification performance but may not be very explanatory, while Logistic regression model has good interpretability and does not have much strict limitation on data distribution, but the classification performance is not high. Therefore, this study uses a parallel combination approach to combine

XGBoost and logistic regression to form a combined XGBoost-Logistics model to construct an evaluation combination model with high classification performance and good interpretability.

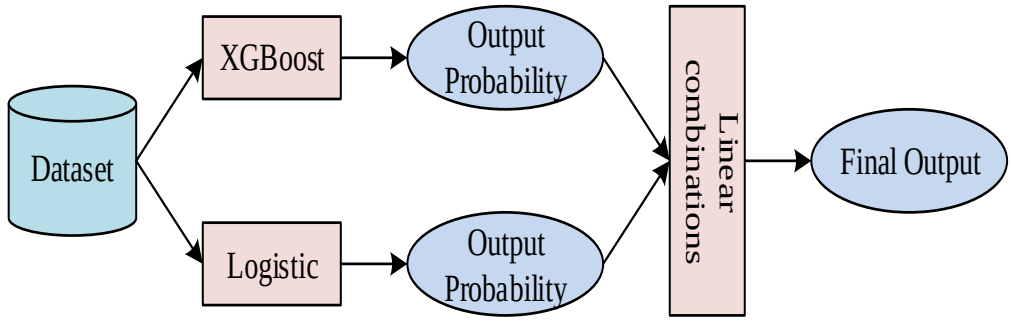


**Figure 1:** Construction principle of XG Boost Logistic composite model

***PSO algorithm***

Figure 2 shows the flow chart of PSO solving the weight coefficients of the combinatorial model. Unlike the serial combinatorial model, the parallel (linear) combinatorial model needs to determine the weight coefficients of each single model. Currently, there are various methods for solving the weight coefficients of linear combinatorial models, mainly equal weight method, least variance method, least squares method, etc. Considering not only to improve the management evaluation classification accuracy, but also to achieve the control of the first category of misclassification, the PSO algorithm is used in this paper. Hypothesis $f_1$ denotes the prediction result of XGBoost model on the training set, $f_2$ denotes the prediction result of Logistic regression model on the training set; $f$ denotes the prediction result of combined XGBoost-Logistic model, $w_1, w_2$ denotes the weight coefficients of XGBoost model and Logistic model, respectively, and combined XGBoost-Logistic model equation is as follows:

$$f = w_1 \cdot f_1 + w_2 f_2 \tag{13}$$

$$w_1 + w_2 = 1 \tag{14}$$

According to the construction principle of the combinatorial model, the fitness function of the example can be set as shown in Equation (15):

$$fitness = k \cdot \frac{1}{Y_T} \sum_{i=1}^{Y_T} \left| f_i - f_1 \right| + \frac{1}{N} \sum_{j=1}^{N_T} \left| f_i - f_j \right| \tag{15}$$

In equation (15), $Y_T$ indicates the number of poorly performing educational evaluations, $N_T$ indicates the number of well performing educational evaluations; $f_i$ indicates the actual output (taking the value of 0 or 1), and K is a constant to control the first type of misclassification rate. The comparison was repeated through the experiment, and it was found that the best results

were obtained when K=10

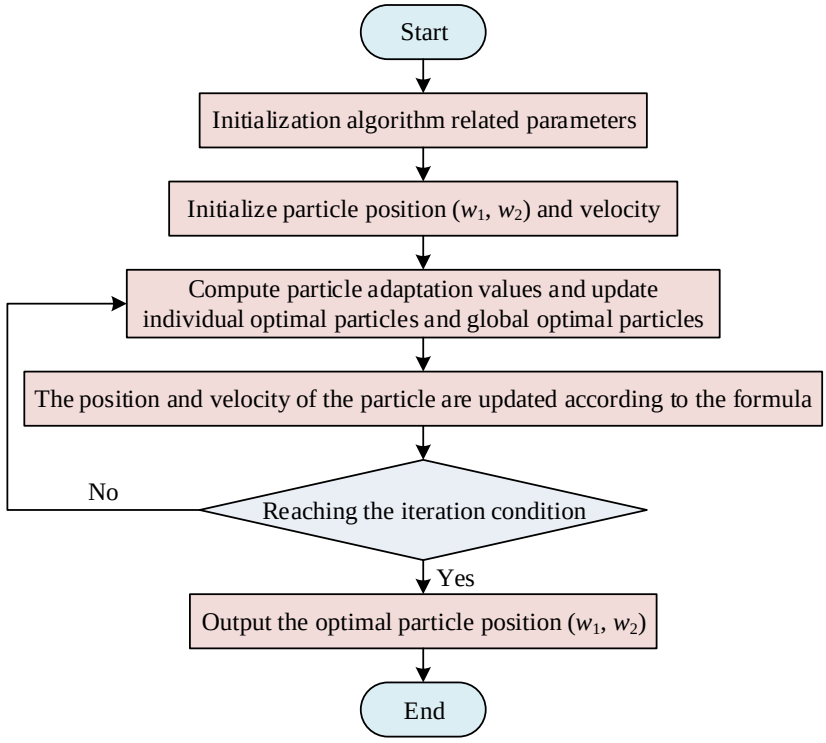


**Figure 2:** Flow Chart of PSO Solving Weighting Coefficient of Combination Model

***ROC curves and AUC values***

ROC curves are generally applied to the evaluation of binary classification models (Pesantez-Narvaez, Guillen, & Alcañiz, 2019). The TPR and FPR are calculated by ranking the samples of the actual results according to the evaluation prediction of the classifier, and the specific expressions are shown in Equation (16) and Equation (17):

$$TPR = \frac{TP}{TP + FN} \tag{16}$$

$$FPR = \frac{FP}{TN + FP} \tag{17}$$

The ROC curve is shown in Figure 3. And plotted with its horizontal and vertical axes, if the curve is closer to the upper left corner, it means that the model classification performance is better, and the closer to the lower right corner, the model classification performance is worse. In addition, if the curve is smooth enough, it can be basically judged that it is not too over-fitted. When AUC≤0.5, it means that the model has poor classification performance and no

discriminative value; when 0.5<AUC≤0.7, it means that the model has low classification performance; when 0.7<AUC≤0.9, the model has high accuracy in discriminative effect and can be used in enterprise credit evaluation practice; when AUC>0.9, the model has the best discriminative effect and its result is optimal.

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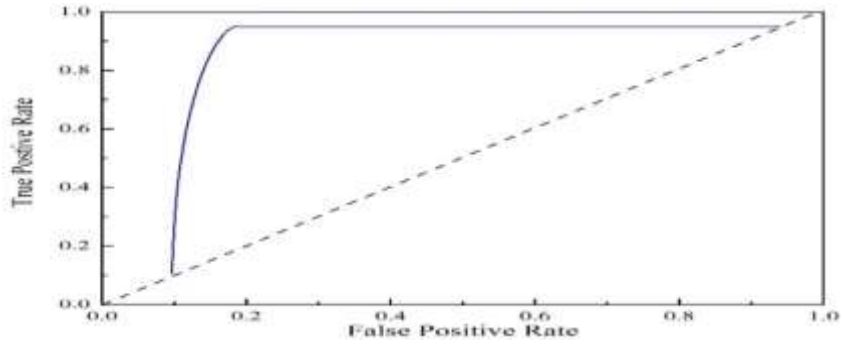


**Figure 3:** ROC curve

## Design and Implementation of Chinese International Education Management Evaluation System

### *Overall design of education evaluation system*

Since the amount of information about school students is very huge, the system should be well designed for scalability at the beginning of development. The clients of the system mainly include the clients of two major parts of school LAN and off-campus Internet. The overall system architecture design is divided into three main layers, namely, the presentation layer, the business layer and the data layer.

### *Design of the system logical architecture*

Figure 4 shows the three-tier logical architecture of the system. The system is designed in B/S mode using a three-layer architecture for the design approach. The creation of business entities and entity behaviors in the business layer is implemented by the programming language C#. The data layer is mainly implemented by the data source control technology and Ado.net technology, etc.; the representation layer requires the support of Asp.Net technology and ajax technology, and the jQuery framework package is used to complete the implementation of ajax technology. The three layers of architecture are closely related to each other, and the lack of one of them does not work. This architecture system links the basic data with the topmost end-user layer to form the technical structure. The business layer is the middle layer of the system, mainly to realize the logic layer of each function of the system, to realize the transformation of user operation, to transform the user's read and write operation into the operation processing of each function completion. The data layer is associated with the business logic layer through the interface,

realizing the various operations of data, completing the reading and storage of data, etc. The presentation layer is the interaction layer between the system and the user, which provides the user access operation to the system in addition to the interfaces of various peripherals.

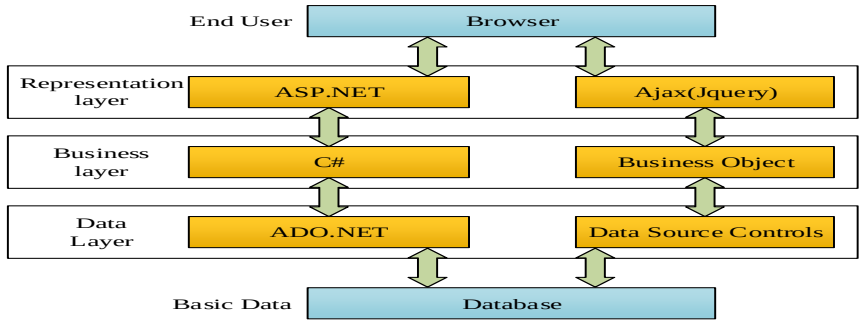


**Figure 4:** Three layer logical architecture of the system

### *System physical architecture design*

Figure 5 shows the physical architecture design of the system. The application server, database server, switch, router, firewall and client users form the physical architecture of the system. Firewall can be set to protect the security of the system server, ensure the security of the campus LAN, and prevent the malicious attack of Trojan horse virus and network hacker. The client use users divide the users into the functions of the system through the Internet. The network structure based on this model allows the system to operate in any network together with the Internet environment under PC office, only accessing the external network conditions, and the client usually operates the system through the browser.

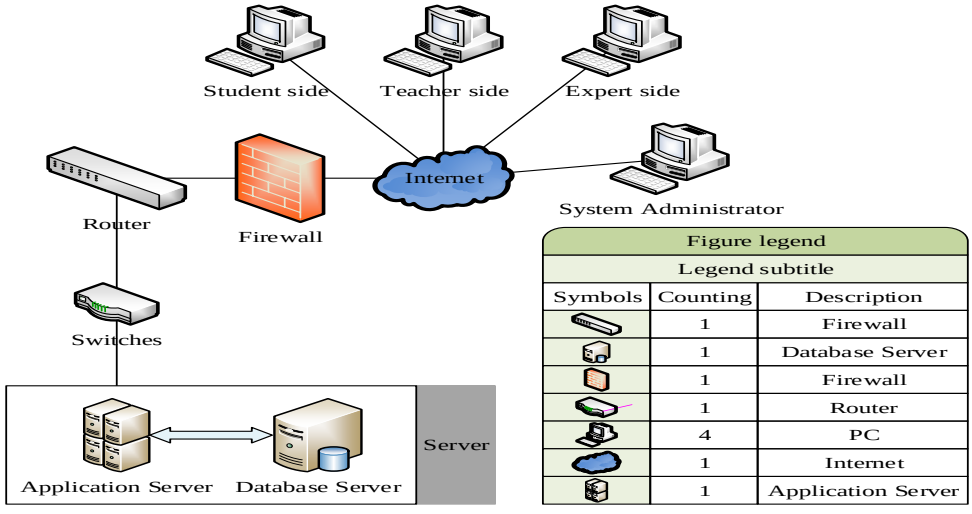


**Figure 5:** System physical architecture design

**Remittances Review**
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***System functional architecture design***

Figure 6 shows the schematic diagram of the functional structure of the education management evaluation system. The comprehensive teaching evaluation process reveals that the whole evaluation process is mainly participated by teachers, students, experts and other users.

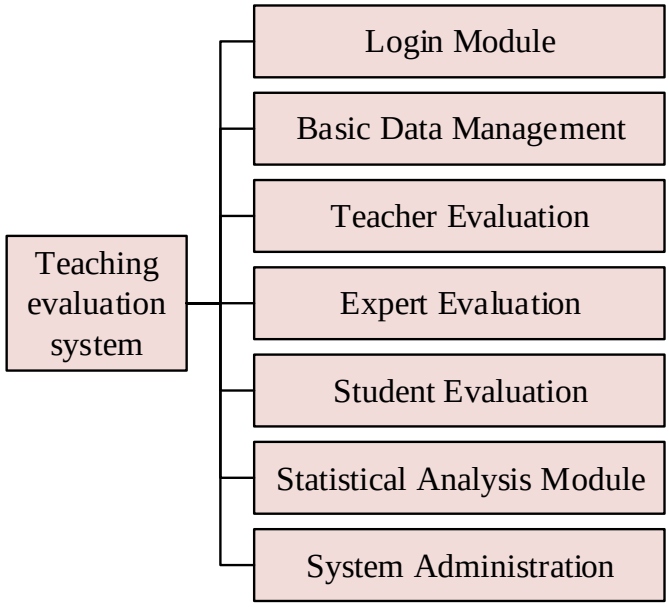


**Figure 6:** Functional structure diagram of teaching evaluation system

***Chinese International Education Management***

***The construction and development of Chinese as a foreign language majors***

After the reform and opening up, with the increase of foreign students coming to China, the shortage of teachers for teaching Chinese as a foreign language emerged, so in 1985, with the approval of the then State Education Commission, four universities, Beijing Language Institute, Beijing Foreign Language Institute, Shanghai Foreign Language Institute and East China Normal University, opened the first batch of undergraduate majors (full-time) in Chinese as a foreign language to train teachers for teaching Chinese as a foreign language. By 2005, there were 62 colleges and universities with undergraduate programs in Chinese as a foreign language, with an annual enrollment of nearly 4,000 students. In recent years, as the international promotion of Chinese language has increased, the shortage of international Chinese language education teachers has become even greater, so the number of colleges and universities approved by the Ministry of Education to offer undergraduate programs in Chinese as a foreign language has greatly increased. According to the data released by the Ministry of Education, there are currently 304 colleges and universities with undergraduate majors in Chinese as a foreign language, with an annual enrollment of more than 15,000 students.

### *The Construction and Development of Master's Degree in Chinese International Education*

As the implementation of the strategy of "going out" of international Chinese language education increases, the number of people studying Chinese in their own countries around the world has increased greatly, and the shortage of teachers teaching Chinese overseas has become increasingly serious.

In order to solve this problem, the decision to set up a professional degree of Master of Chinese Language International Education was passed at the 23rd meeting of the Academic Degrees Committee of the State Council in January 2007. The first batch of 24 graduate training units, including Beijing Language and Culture University, Peking University and Renmin University of China, were approved to carry out the pilot work of master's degree education in Chinese international education.

In the first batch of 2007, it was stipulated that applicants must be working people with 2 years or more working experience, and the nature of training was part-time, and only a degree certificate was issued upon graduation. 2008, the enrollment conditions were relaxed, and fresh undergraduates could also apply. 2009, the nature of training was changed to full-time, and the duration of study was two years. In 2009, the nature of training was changed to full-time, the study period is two years, and the academic certificate and degree certificate are issued upon graduation. In 2009, the nature of training was changed to full-time, and the duration of study was two years, and the degree and diploma were awarded upon graduation. According to the data released by the Ministry of Education, there are now 81 colleges and universities offering Master's degree in Chinese International Education.

### *The mismatch between foreign Chinese teacher training and employment*

The main purpose of the Chinese as a Foreign Language program is to train teachers to teach Chinese as a foreign language. However, there are more and more findings that show that a very low percentage of graduates from Chinese as a Foreign Language majors are working in the field of teaching Chinese as a second language. Even at Beijing Language and Culture University, which was the first to offer the Chinese as a Foreign Language program, the percentage of graduates entering the field of teaching Chinese as a second language is alarmingly low.

From such an employment situation of the graduates of the Chinese as a Foreign Language program, the Chinese as a Foreign Language program has lost its function of providing teachers for the teaching of Chinese as a foreign language, which defeats the original purpose of the program.

### *Poorly targeted teacher training for overseas Chinese language teaching*

The current goal of the M.A. in Chinese International Education is to train universal overseas Chinese teaching teachers, that is, it is to achieve the goal that the graduates it produces will be

competent to teach Chinese around the world.

This goal is unrealistic and simply cannot be achieved. Therefore, many schools end up producing teachers who are actually only able to teach Chinese to students from English-speaking countries.

International Chinese language education is spread all over the world, and the characteristics of teaching objects, teaching environment, teaching goals and education policies of different countries are different. If the master's degree in Chinese international education can set different training directions for Chinese language teaching in different countries, the graduates will undoubtedly be more competent to teach Chinese in the countries in which they are trained.

However, at present, we have not seen any school set up the training direction of M.A. in Chinese International Education specifically for the teaching of Chinese in a particular country.

***Evaluation index system***

After obtaining the quality evaluation indexes of Chinese international education, it is necessary to assign weights to each index, that is, to set the weights of each index.

In this paper, the whole project is divided into three levels for evaluation, and further establishes a progressive hierarchical analysis model, as shown in Table 1.

Top Level Indicator:This is the overall evaluation or overall target, which is **A**.

Primary indicators: According to the indicator system, the three main indicators are teachers' evaluation, experts' evaluation and students' evaluation, which are recorded as $B_1$、$B_2$、$B_3$.

Secondary indicators: mainly the indicators at the next level of teacher evaluation, expert evaluation and student evaluation, i.e. teaching preparation, teaching process and teaching effectiveness, which are recorded as $C_1$, $C_2$, $C_3$, $C_4$, $C_5$, $C_6$, $C_7$, $C_8$ and $C_9$ respectively.

Three levels of indicators: the bottom level of the indicator system, including 7 indicators of teacher evaluation, 7 indicators of expert evaluation and 10 indicators of student evaluation.

They are recorded as $D_1$, $D_2$, $D_3$, $D_4$, $D_5$, $D_6$, $D_7$, $D_8$, $D_9$, $D_{10}$, $D_{11}$, $D_{12}$, $D_{13}$, $D_{14}$, $D_{15}$, $D_{16}$, $D_{17}$, $D_{18}$, $D_{19}$, $D_{20}$, $D_{21}$, $D_{22}$, $D_{23}$, $D_{24}$, respectively.

After constructing the index system, in this paper, when setting the index weights, the leaders and experts in charge of teaching management work assign weights to the indexes at each level.

After the weight assignment is finished, the indicators at the bottom level are firstly evaluated quantitatively, and then the corresponding markup indicators are obtained, and the corresponding evaluation analysis is carried out based on the logistics model.

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**Table 1** (**A)** Evaluation system table

| Tier 1 Indicators | Indicator symbols | Secondary indicators | Indicator symbols | Tertiary indicators | Indicator symbols |
|---|---|---|---|---|---|
| Expert evaluation indicators | $B_1$ | Teaching preparation | $C_1$ | Teaching documents are complete, teaching aids are plentiful, and courseware is clear and consistent with teaching | $D_1$ |
| | | | | Arrive 5 minutes before class to prepare for class | $D_2$ |
| | | Teaching process | $C_2$ | The teaching content is practical, reflects the development trend of the discipline and introduces the frontier of technological development | $D_3$ |
| | | | | Humourous and compelling language, accurate and fluent | $D_4$ |
| | | | | Humourous and compelling language, accurate and fluent | $D_5$ |
| | | | | Strong classroom management skills and ability to think outside the box | $D_6$ |
| | | Teaching effectiveness | $C_3$ | A lively classroom atmosphere, focusing on the development of students' knowledge and abilities | $D_7$ |
| | | | | The teaching process is in line with the cognitive characteristics of the students | $D_8$ |
| Teacher evaluation indicators | $B_2$ | Teaching preparation | $C_4$ | Teaching documents are complete and well formatted, with clear, consistent content and teaching | $D_9$ |
| | | | | Arrive 5 minutes before class to prepare for class | $D_{10}$ |

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**Table 1** (**B)** Evaluation system table

| Tier 1 Indicators | Indicator symbols | Secondary indicators | Indicator symbols | Tertiary indicators | Indicator symbols |
|---|---|---|---|---|---|
| | | Teaching process | $C_5$ | The teaching content is practical, reflects the development trend of the discipline and introduces the frontier of technological development | $D_{11}$ |
| | | | | Fluent, informative, accurate knowledge and skilled delivery | $D_{12}$ |
| | | | | Well-organised, in-depth, well-written and interactive | $D_{13}$ |
| | | | | Well-groomed, energetic, responsible and well-prepared | $D_{14}$ |
| | | Teaching effectiveness | $C_6$ | A lively classroom atmosphere, focusing on the development of students' knowledge and abilities | $D_{15}$ |
| | | | | The teaching process is in line with the cognitive characteristics of the students. | $D_{16}$ |
| Student Assessment Indicators | $B_3$ | Teaching preparation | $C_7$ | Teaching documents are complete and well formatted, with clear, consistent content and teaching | $D_{17}$ |
| | | | | Arrive 5 minutes before class to prepare for class | $D_{18}$ |
| | | Teaching process | $C_8$ | The teaching content is practical, reflects the development trend of the discipline and introduces the frontier of technological development | $D_{19}$ |
| | | | | Enthusiasm, vivid language, accurate expression and infectious | $D_{20}$ |
| | | | | Well-organised, in-depth and well-written board | $D_{21}$ |
| | | | | The teaching methods are appropriate, with an emphasis on realistic integration and a clear understanding of what the teacher is teaching | $D_{22}$ |
| | | Teaching effectiveness | $C_9$ | Lively and humorous teaching, very interested in learning the course | $D_{23}$ |
| | | | | Assign homework on time, correct assignments and answer questions patiently | $D_{24}$ |

***Data Analysis***

Figure 7 shows the accuracy rates of the secondary indicators of Chinese international education. Using the logistic regression model to analyze the secondary indicators of Chinese international education, the accuracy rates of all indicators in the XGBoost-Logistics model were maintained within the range of 84.22%~89.12%, and the accuracy rate of C8 indicators in each indicator was the highest, with an average accuracy rate of 85.56%. In the Logistic model, the accuracy of all the indicators remained in the range of 76.75% to 82.73%, and the accuracy of C9 indicators was the highest, with an average accuracy of 77.72%. In the XGBoost model, the values of all indicators were kept in the range of 69.32% to 74.54%, and the accuracy of C2 indicators was the highest among all indicators, with an average accuracy of 72.54%. Overall, the accuracy performance of the combined XGBoost-Logistics model is better than the other two models. The combined XGBoost-Logistics model is more conducive to the evaluation and analysis of educational management, thus improving the efficiency of educational management.

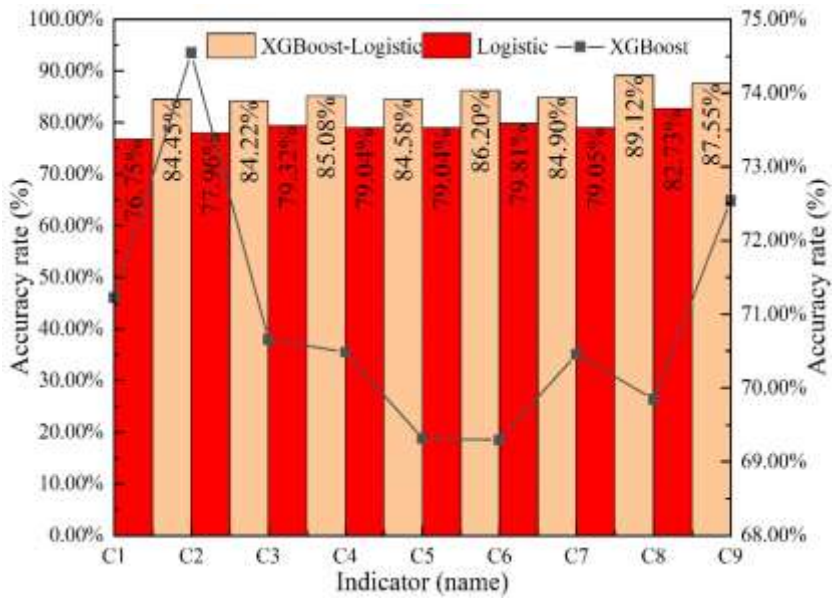


**Figure 7:** Accuracy rate of secondary indicators of international Chinese education

Figure 8 shows the accuracy rates of the three-level indicators of Chinese international education. Using the logistic regression model to analyze the three-level indicators of Chinese international education, the accuracy rates of all indicators in the XGBoost-Logistics model were maintained within the range of 83.71%~91.39%, and the accuracy rate of D13 indicators in all indicators was the highest, with an average accuracy rate of 87.81%. In the Logistic model, the accuracy of all the indicators remained in the range of 76.78% to 82.23%, and the accuracy of the total D19 indicators was the highest, with an average accuracy of 79.64%. In the XGBoost model, the values of all indicators were kept in the range of 63.97%~71.18%, and the accuracy rate of D13

indicators was the highest among all indicators, with an average accuracy rate of 67.17%. From the overall average accuracy of the three-level metrics, the combined XGBoost-Logistics model performs better than the Logistic regression model and XGBoost model, and is more accurate in making the most accurate evaluation of users.

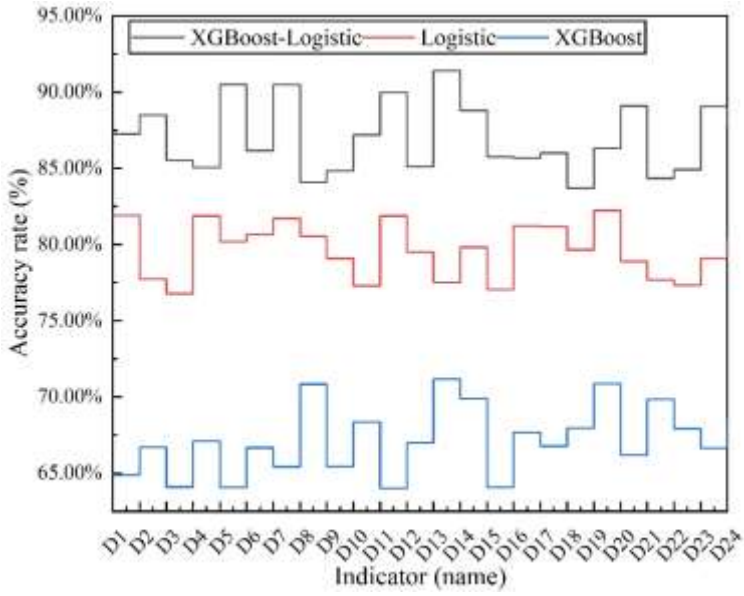


**Figure 8:** Accuracy rate of three-level indicators of international Chinese education

## Conclusion

This paper constructs an evaluation system for Chinese international education management based on big data technology using logistic regression model. Firstly, we propose the framework and ideas of the evaluation system according to the evaluation requirements of the system, then we realize the design of the system and construct the evaluation index system according to the framework, and finally we use three different models to analyze the data of the index system and draw the following conclusions.

(1) In the analysis of the accuracy rate of secondary indicators:The accuracy rate of each indicator in the combined XGBoost-Logistics model varies from 84.22% to 89.12%, and among the nine secondary indicators, the accuracy rate of C8 indicator is the highest, with an average accuracy rate of 85.56%, the average accuracy rate of Logistic model is 77.72%, and the average accuracy rate of XGBoost model The average accuracy rate of XGBoost model is 72.54%. The XGBoost-Logistics combination model is better than the other two models in terms of average accuracy, and the education management evaluation system is more accurate in user evaluation and analysis, thus improving the management of Chinese international education.

(2) In the analysis of the accuracy rate of the three-level indexes: the accuracy rate of the

evaluation indexes of the XGBoost-Logistics combination model fluctuates from 83.71% to 91.39%, and the average accuracy rate of its indexes is 87.81%, and in terms of the performance of the average accuracy rate of the three-level indexes: the XGBoost-Logistics combination model is better than the other two models. By analyzing the three-level indicators, we can better reflect the feedback of the system, and improve the efficiency of education management according to the feedback, so as to realize artificial intelligence education management.


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