Evaluation Model of College English Teaching Quality Based on Big Data Analysis

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Abstract. With the implementation of internationalization, the quality of English education has become more and more important. How to assess English Teaching Quality of contemporary college students has become one of the research hot spots. The widespread application of big data analysis is to solve the current English Teaching of college students. Evaluation issues provide new directions for resolution. Construction of College English TQA System Based on Big Data Analysis. It is based on the construction of big data of college students 'English teaching quality, by constructing a model, visually presenting the college English teaching quality trajectory, so as to understand the students' learning situation more intuitively. Aiming at the complex changes in the quality of English teaching, this paper designs a big data analysis model of English teaching quality for college students in order to obtain high-precision evaluation results of English teaching quality. This paper uses big data analysis technology to build a college English TQA model, and experimentally verifies the reliability of the model established in this paper. After experimental verification, it is found that the big data analysis of the college English TQA model proposed by this paper has an evaluation accuracy of 90.22% This fully demonstrates the reliability of the model and provides a good reference value for the evaluation of teaching quality.

Keywords: Big Data Analysis, College English, Teaching Quality Evaluation, Evaluation Model

1. Introduction

Good or bad teaching can directly reflect the teacher's personal teaching level, and it is the key to cultivating high-quality talents. The monitoring and assessment methods can directly evaluate and confirm the role of teachers in teaching, and also conduct formal teaching quality. An inevitable teaching activity of value comparison is a key link in the construction of teaching quality. In college education, English is a compulsory course for every college student, and colleges and universities have certain requirements for college English level. The quality of teaching is a key indicator of the...
effectiveness of English teaching. The evaluation of English teaching quality is a very complicated process involving many factors, such as evaluation indicators and evaluation methods. Therefore, an objective and scientific evaluation system of English teaching quality is established. Is a challenging issue. Compared with other courses, English teaching has its own particularities. For example, it is more interactive and the knowledge is more coherent, so it is much more complicated than the TQA of general courses. At first, colleges and universities used simple statistical methods to assess the quality of English teaching. It is assumed that the effect of English teaching and the evaluation index are a fixed change relationship. By determining the changing parameters, the corresponding assessment results of English teaching quality can be obtained. In fact, there is not a simple relationship between the teaching effect and the assessment index, so the credibility of the assessment result is low. Subsequently, an expert system was introduced to evaluate the quality of English teaching Universities generally use some professors and experts in the school to evaluate the effectiveness of a teacher's English teaching, and sometimes introduce student assessment results. The assessment results of this method have high credibility. However, each school focuses on different assessment indicators, which leads to a certain subjectivity and poor objectivity in the Assessment of English teaching quality.

With the continuous expansion of the scale of education in China, further strengthen the teaching quality management with the core of improving teaching quality, continuously improve the ability and quality of training and education talents, and further build an internal teaching quality monitoring system and teaching assessment in colleges and universities. System construction has also become the key to the sustainable development of higher education [1]. Therefore, it is necessary to further carry out research and development of teaching quality monitoring and assessment system in school teaching, improve the teaching education concept, assessment monitoring system and related regulations and policies, and establish a long-term mechanism in teaching quality monitoring and early warning control. To promote the advancement of school teaching management, improve the utilization rate of personnel and the quality of training [2-3]. With the advancement of science and technology, the era of big data has arrived, and the further maturity of big data analysis technology has provided a lot of convenience for people. The application of big data analysis technology to the teaching quality assessment model provides a solution to the problem of college English TQA. New ideas, which are of great significance for teaching quality assessment[4-5].

This paper uses the method of major component analysis in big data analysis technology to establish a model for evaluating the English Teaching of college students, and verifies the reliability of the model through experiments. This method can accurately evaluate the English Teaching and can be used for the English teaching process. Provide certain reference information.

2. Method

2.1 Establishment of Evaluation System

(1) Construction of comprehensive evaluation index system for teaching quality in universities

Determining a set of scientific and reasonable TQA index system is the primary task of TQA. Some scholars mainly evaluate the teaching quality of teachers, and generally include first-level indicators such as teachers' work attitude, teaching and research capabilities, and specific knowledge literacy. First-level indicators. Some scholars focus on the evaluation of classroom teaching, which generally includes first-level indicators such as teachers' moral education, teaching attitude, classroom teaching ability, teaching methods, and teaching content, and then set secondary indicators. But the teaching process is a complex system composed of schools, teachers, teaching environment, students, teaching resources and other factors that affect the quality of teaching. Each influencing factor affects the quality of teaching through interaction and their respective effects. From the teacher's perspective, the quality of teaching is influenced by teachers' quality, teaching attitude and so on. Teacher quality is an important indicator that affects the quality of teaching. It can be considered from two main dimensions: teaching and scientific research. Teaching attitude directly affects the effectiveness of
classroom teaching. It can be evaluated from the basic attitude of teachers and the basic attitude of educating people. The teaching content mainly considers the question of "what to teach" to students, and it should be evaluated in combination with specific subject content. Finally, the teaching method is a question of "how to teach", a measure for teachers to implement teaching activities, and an important means to improve teaching quality. The appearance of different teaching effects must be related to specific teaching methods. Generally speaking, teaching methods mainly include three aspects: specific teaching methods, the use of teaching media, and the form of teaching organization.

(2) The establishment of an English TQA system for college students

The evaluation of teaching quality must objectively reflect the basic situation of the course teaching, such as course assessment and evaluation methods, assignments and corrections, whether the teaching language is vivid and vivid, and the application of the online teaching platform. Highlight the core elements of evaluation to improve the objectivity and accuracy of evaluation indicators. Therefore, the evaluation model of college students' English teaching quality is based on student participation, recognition, satisfaction and implementation effects, and constructs a curriculum evaluation index system. The curriculum evaluation system consists of four levels: the target level, the first level index level (comprehensive index level), the second level index level (detailed index level), and the third level index level (evaluation target level). There are 4 first-level indicators and 11 second-level indicators. There are 30 observation points for the three first-level indicators of teachers' teaching level, assessment method and curriculum teaching mode; 11 observation points for the first-level indicators of student learning status; plus overall evaluation, there are 42 observations for curriculum evaluation indicators. After excluding 3 observation points and overall evaluation of the degree of difficulty of the curriculum, there are 38 observation points remaining in the curriculum evaluation index system. Each observation point of the three first-level indicators of the teacher's teaching level, assessment evaluation method, and curriculum teaching mode has its evaluation level. The scores are as follows: "Very Satisfied" scores 5 points; "Some Satisfied" scores 4 points; "Slightly Satisfied" scores 3 points; "Not Effective" scores 2 points; "No Effect" scores 1 point; "No Application / No "Knowing" scores 0 points. The evaluation levels and scores of the remaining 8 observation points of the first-class indicators of students' learning status are as follows: "Much more than other courses" scores 5 points; "More than other courses" scores 4 points; "Same as other courses" scores 3 points; "Less than other courses" scores 2 points; "Much less than other courses" scores 1 point; "No application / don't know "scores 0 points. Quantitative assessment of the above 38 observation points is 190 points. The comprehensive evaluation score of the course teaching exceeds 152 points, which indicates that the course teaching quality is good, the learning effect is good, and the learning gains are large; if the total score is less than 114 points, it indicates that the course teaching quality is poor, and the teacher needs to reflect on the teaching process and teaching methods in a timely manner Make adjustments.

2.2 Establishment of a Model for Evaluating College Students' English Teaching Quality Based on Big Data Analysis

(1) Principal component analysis algorithm

There are many evaluation indexes of English teaching quality, which need to be screened by certain techniques to reduce the number of evaluation indexes. This paper introduces principal component analysis to achieve the selection of the English TQA [6-7]. The principal component analysis algorithm can combine the indicators of English teaching quality to obtain a new set of indicators. The new indicators can describe most of the information of all the original indicators, thereby effectively reducing the number of input vectors of the English TQA classifier [8-9]. The specific steps are:

1) The set of original English TQA indicators is \( X = (X_1, X_2, \ldots, X_p) \), and \( p \) indicates the number of evaluation indicators. Because the units of English TQA indicators are different, the data are very different, which will have a negative impact on the results of English TQA [10-11]. In order
to eliminate this negative impact, the index values of the quality evaluation of English teaching are standardized, as follows:

\[
\bar{x}_{ij} = \left( x_{ij} - \bar{x}_j \right) / s_j \quad (1)
\]

2) Calculate the correlation coefficient matrix of the evaluation index of English teaching quality, and get:

\[
R = \left( r_{ij} \right)_{n \times p}, r_{ij} = \frac{\sum_{k=1}^{n} x_{ik}x_{kj}}{n-1} \quad (2)
\]

3) The eigenvalues can be obtained by solving the characteristic equation.

4) Calculate the cumulative variance contribution rate of the main components When the current main components meet the relevant conditions, then this main component can be considered as a new index of the TQA after processing, which serves as a new feature vector for the evaluation of English teaching quality and reduces teaching The dimension of the quality evaluation index [12-13].

(2) Construction of an evaluation index system for English teaching quality

In order to obtain the ideal evaluation result of English teaching quality, we must first construct the optimal evaluation index system [14-15]. At present, there are many methods for the evaluation index system of English teaching quality, and the selection criteria of each method are different. For example, some focus on teaching content, some focus on classroom teaching, and other aspects supplement it. This article constructs the evaluation indicators from two aspects, one is the teacher and the other is the student.

Among them, the teacher's own teaching indicators include: the number of suspensions, the number of adjustments, the number of early departures, the number of substitutes and the number of homework assignments. The teaching evaluation indicators from students include: the rationality of the course content, the quality of the classroom atmosphere, whether the course content has practical significance, the organization of the lectures, the level, the teaching skills, vividness, the teacher's sense of responsibility, and the seriousness of correcting assignments And patience.

(3) Working steps of English TQA model

The working steps of the English TQA model are as follows:

1) The results obtained according to the principal component analysis and processing of the original learning samples for the evaluation of English teaching quality can effectively reduce the data size.

2) Learn the training samples of English TQA based on support vector machine and establish the classification function of English TQA.

3) Evaluate the training samples according to the classification function of English TQA, and get the corresponding English teaching quality level.

3. Experiment

(1) Data source

In order to analyze the evaluation effect of TQA, the English classroom teaching effect of a certain university was selected as the research object, and relevant data was collected according to the 13 evaluation indicators established by the model, and the corresponding English teaching quality grade values were obtained by experts, and a total of 200 samples were obtained. Some data are shown in Table 1.
Table 1. Data from operation completion

| Sample number | X1 | X2 | X3 | ... | X13 |
|---------------|----|----|----|-----|-----|
| 1             | 9  | 10 | 8  | ... | 5   |
| 2             | 7  | 8  | 9  | ... | 6   |
| 3             | 6  | 10 | 8  | ... | 9   |
| 4             | 8  | 10 | 8  | ... | 8   |
| 5             | 8  | 8  | 8  | ... | 10  |
| 6             | 8  | 9  | 6  | ... | 8   |
| ...           | ...| ...| ...| ... | ... |

(3) Data from operation completion

The principal component is used to analyze the data to obtain the cumulative contribution rate of the principal component and analyze the cumulative contribution rate. Five principal components were selected to reconstruct the English TQA data, and 20 data were used as test samples. The other training samples were used to test the English TQA. In the process of evaluating the quality of English teaching, the choice of kernel functions of support vector machines is very important. The results of different evaluations of English teaching quality obtained by different kernel functions are different.

4. Discuss

4.1 Results of the Principal Component Analysis Algorithm

Using the principal components to analyze the data in Table 1, the cumulative contribution rate of the principal components is shown in Table 2.

Table 2. Index processing results of principal component analysis algorithm

| Number | Characteristic value | Contribution rate (%) | Cumulative contribution rate (%) |
|--------|----------------------|------------------------|----------------------------------|
| 1      | 4.26                 | 55.24                  | 55.24                            |
| 2      | 1.75                 | 15.09                  | 70.33                            |
| 3      | 0.724                | 10.15                  | 80.48                            |
| 4      | 0.424                | 6.46                   | 86.94                            |
| 5      | 0.115                | 1.54                   | 88.48                            |
| ...    | ...                  | ...                    | ...                              |

From the analysis of the cumulative contribution rate in Table 2, it can be seen that the cumulative contribution rate of the first five principal components exceeds 85%, which indicates that they can represent important information of the original indicators. Therefore, five principal components were selected to reconstruct the English TQA data. And 20 data were used as test samples, and the others were training samples for evaluating the quality of English teaching.

4.2 Performance Analysis of Evaluation Results of College Students' English TQA Model Based on Big Data Analysis

The model of this paper is used to evaluate the quality of English teaching, and the evaluation results of 20 test samples are obtained. The big data analysis model of college students' English TQA is compared with other models. The results are shown in Figure 1.
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