



# Data Mining for Quality Analysis of College English Teaching

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**Abstract.** This paper will introduce the factors that affect the quality of college English teaching in detail. Through professional research and investigation, the researchers take the quality of English teaching in a certain university as an example. The practical application of data mining technology in college English teaching quality is demonstrated by confirming the test object, test method, sample form, test result and result analysis, in order to optimize the teaching effect with the help of network technology.

**Keywords:** Data mining technology · College English · Teaching quality

## 1 Introduction

With the rapid change of English teaching form, the factors affecting the quality of college English teaching are gradually increasing. In order to accurately evaluate the actual effect of English teaching reform, researchers have introduced data mining technology in due course. Through the reasonable application of this technology to find out the actual impact of various elements on English teaching. The composition of traditional teaching quality indicators is often based on the experience of the makers. There are many subjective and qualitative components in the indicators, and the weight distribution of indicators is mostly based on subjective experience, even the same. Many different disciplines and different types of courses adopt the same teaching quality indicator system. In fact, College English teaching has its own characteristics (such as emphasizing the interaction between teachers and students, diversified teaching modes and conditions, etc.), many factors that affect the quality of teaching are often hidden in the teaching process, environment and conditions and are not easy to be found. Only by showing these factors can we design teaching quality indicators that are not only in line with the characteristics of College English teaching, but also scientific, reasonable and avoid subjective [1–4].

## 2 Experimental Design

### 2.1 Object and Purpose of the Experiment

From April to June in 2007, 1132 non English Major Freshmen in a university were selected as the subjects of the survey. Taking the making notable progress (MNP) of

students as the objective evaluation index, this paper analyzes the factors influencing MNP by CHAID (chi squared automatic interaction detector) algorithm. (Note: in this experiment, the improvement of students' scores by more than 5% under the same test difficulty is regarded as the standard of students' obvious progress [5, 6].

### 2.2 Experimental Methods

This paper uses CHAID algorithm to analyze the factors that affect MNP. CHAID is an analysis method based on target optimization, which has the functions of target selection, variable selection and clustering. It is suitable for classification and rank data analysis. According to the given response variables and the selected explanatory variables, the optimal segmentation of samples is carried out. According to the significance of chi square test, the automatic judgment grouping of multiple contingency table is carried out. Generally, it has good effect on the automatic classification of discrete data sets [7].

### 2.3 Sample Characteristics

In order to systematically observe the teaching factors that affect students' learning quality, we designed 13 attributes that may affect the teaching quality, such as "learning purpose", "teaching means", "teaching mode" and "teacher type" [8]. Some of these attributes reflect the subjective factors in students' learning process, such as "learning purpose", "overall evaluation of teachers" and "entrance English achievement", while others reflect the objective factors such as teaching conditions and environment, such as "teaching mode", "teaching means" and "teacher's degree", The complete sample statistics are shown in Fig. 1.

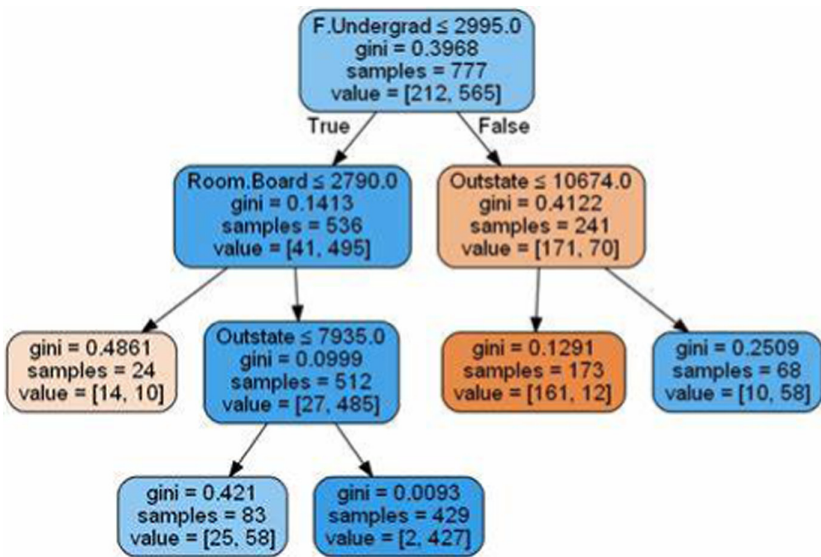


Fig. 1. Experimental chart of sample statistics

### 3 Elements Affecting the Quality of College English Teaching

#### (1) Purpose of study

There are many factors that affect the quality of college English teaching. The most important factor is the students' learning purpose. Specifically, for college students, they have studied English for a long time and have a certain understanding of the subject. The important factor affecting its development and progress is learning purpose, that is, interest. When students are interested in English learning, their subjective will to learn this subject will be stronger, which not only effectively enhances classroom participation, but also improves English learning thinking. By perfecting listening, speaking, reading and writing in English courses, the passion of language learning will be aroused, and the quality of English teaching will be guaranteed [9].

#### (2) Teaching model

The teaching mode of college English will also affect the teaching quality of this subject. Because foreign language teaching has strong practicality, both students and teachers should strengthen English practice in time compared with other courses. Use listening and speaking in English teaching to master the connotation of the subject and improve the practical application of English subjects [10]. In college English classroom, teachers should take the content of teaching materials and the actual level of students as the basis, and increase the communication and practicality of English classroom through the change of English teaching form. On the basis of ensuring students' English theoretical knowledge, teachers should improve their English literacy with practice and promote the overall development of teaching.

#### (3) Students' emotional factors

Cultivate students' emotional factors. When teaching English to college students, teachers should give up the traditional means of indoctrination, cultivate students' interest in learning English and students' feelings for English, and strive to narrow the gap between teachers and students, establish an equal relationship between teachers and students. In class, teachers should not keep a straight face, but smile and increase the sense of intimacy. The second sister can use more body language to increase the interaction and communication between teachers and students [11–14].

### 4 Practical Application of Data Mining Technology in Quality Analysis of College English Teaching

#### (1) Test subjects

In order to explore the quality of college English teaching, the relevant researchers use data mining technology to analyze the phenomenon in an all-round way, and confirm the experimental object before carrying out the formal research. The subjects of this experiment are 1132 non-English majors in the second grade of a university. The objective evaluation criteria are designed by using the progress of individual scores of each student. The index is MNP, professional analysis with the help of CHAID algorithm and MNP elements [15].

(2) Test methods

Through the CHAID algorithm, the researchers analyze the MNP elements in detail. In this algorithm, the clustering function, variable selection and target selection can be used to analyze and judge the order grade data and classification. CHAID algorithm can optimize and segment the samples according to the selected explanatory variables and reaction variables, and automatically form groups related to significance according to chi-square test. Discrete class data sets are used to show the actual effect of automatic classification. The data mining algorithm is shown in Fig. 2.

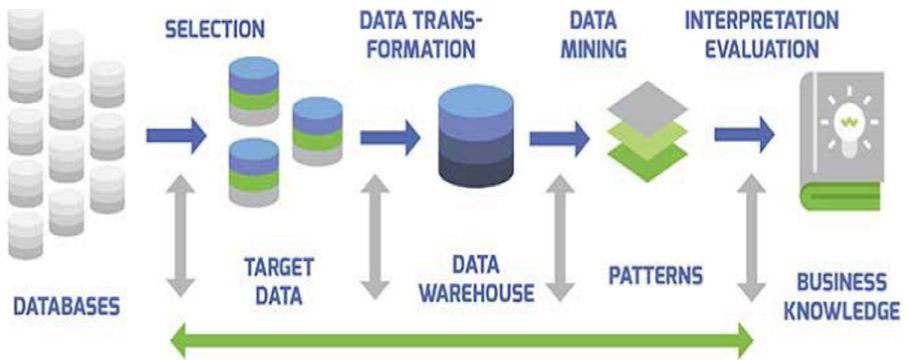


Fig. 2. Data mining algorithm

(3) Sample morphology

In order to better test the quality of college English teaching and find out all kinds of factors that affect students' English learning, relevant personnel should design a set of appropriate questionnaires, the main contents of which can be set as teacher type, teaching mode, teaching means and learning purpose [16].

For example, the questionnaire for the teaching model can cover a variety of elements. The specific data are shown in Table 1. The corresponding effects brought to students when teachers use different English teaching models can be seen from the data in Table 1.

Table 1. Survey data related to teaching patterns

Teaching model	Happy English	College English	New Vision English
Number of samples (s)	422	387	110
% of total (%)	37.3	34.2	9.8
Learning status	Optimal	Optimal	Difference

After completing the questionnaire survey, the relevant researchers can put the data information they obtain into the network information system, through the efficient fusion of data mining technology and decision tree, timely collate, analyze and study the impact of various data on the quality of college English teaching, and then increase the scientific nature of the experiment [17].

(4) Test results

With the exploration of data mining technology, relevant researchers have found that this element has brought changes to the quality of English teaching. According to the relevant data, there are 52 nodes with more than 95% confidence level in the decision tree. The teaching or learning quality in this study is mainly the ratio of individual achievement to obvious progress under the same difficulty. Using the decision tree in the network information system, we can find out the relationship between the CHAID algorithm and the MNP elements. The flow chart of the experiment is shown in Fig. 3.

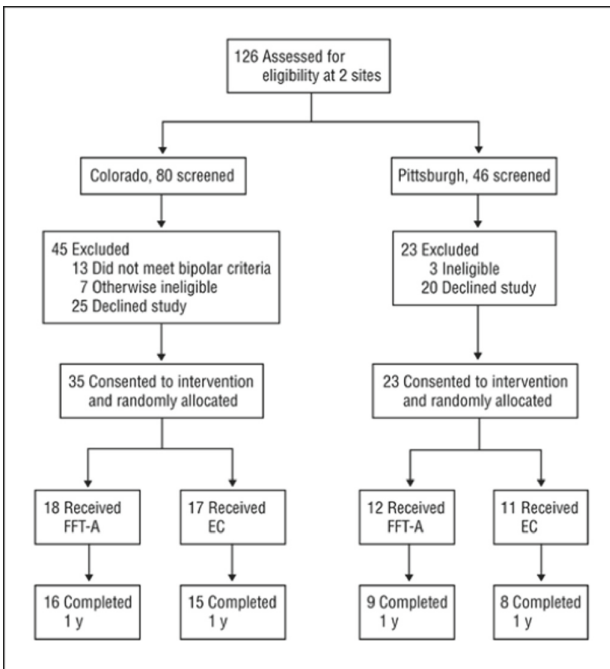


Fig. 3. Experiment flow chart

In the current sample of sophomore students, the total number of students is 1132, compared with the last examination, there are 208 students who have made more than 6% progress, accounting for 18% of the total sample. According to the data in the decision tree, the most important factor affecting the quality of students' English learning is "learning purpose", which is very appropriate. Learning purpose will affect the subjective initiative of college students. As a second language, if

students' participation is not strong, it will not only affect their learning state, but also reduce the overall quality of English learning. In addition, teaching mode and teaching method also affect students' English learning quality. Compared with the subjective elements of learning purpose, this objective element also always affects students' English learning style and result.

(5) Analysis of results

After understanding the main factors affecting students' English learning, the relevant researchers can analyze the influence degree of learning purpose, teaching mode and teaching method in detail [18]. Specifically, the purpose or motivation of learning mainly represents the interest of learning, that is, the teacher's teaching in English classroom or the attraction of the subject itself. With the rapid development of network information technology, teachers need to bring this technology into English classroom, that is, to enhance the attractiveness of English classroom by means of multimedia technology. For example, in normal English learning, the content of teaching materials covers four items of listening, speaking, reading and writing, while in practical teaching, teachers pay more attention to reading and writing, and ignore the two items of listening and speaking. The main purpose of English is communication tools. If students are difficult to communicate in English, it will greatly weaken their interest in English learning, It also reduces its learning effect. If multimedia technology is used in formal English classroom, it will not only stimulate students' hearing and vision, but also increase the sense of classroom participation and improve the practical effect of English learning. Figure 4 is the result analysis chart:

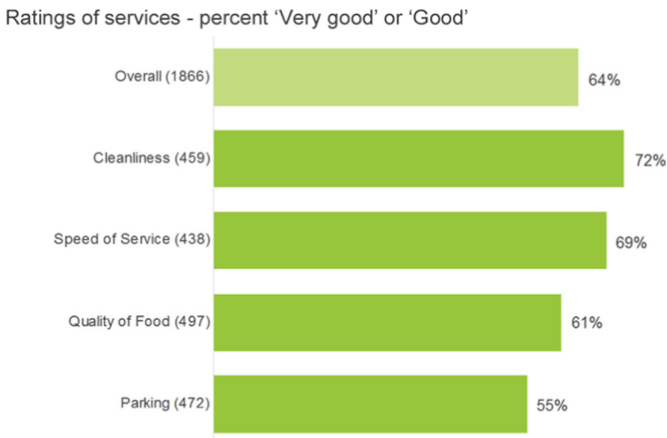


Fig. 4. Result analysis chart

At the same time, the teaching mode and teaching method will also affect the English learning quality of sophomore students. Because the students in this stage already have a certain English foundation, teachers should actively change teaching methods in English

classroom teaching. Strengthen the English level of each individual student with various teaching forms. Under the influence of learning attitude and learning ability, students' English scores will be greatly different. Teachers should always adhere to the concept of teaching according to their aptitude, design more appropriate learning methods for students with different abilities, and strengthen the effectiveness and pertinence of teaching. Through the improvement of learning purpose, teaching method and teaching mode, teachers and students can make progress together to improve the overall quality of English teaching [19].

Moreover, with the help of data mining technology and decision tree, relevant researchers can also find out the correlation between CHAID algorithm and MNP elements. Generally speaking, each node can fully reflect the results of MNP elements. That is, we can see the teaching quality of college English teaching in different environments and elements, such as teacher education, teaching means, teaching mode and so on. Through the data index researchers in each node, we can find out the actual influence of each element on the effect of English teaching. For example, 44 samples and 13 MNP elements are included in 52 nodes. The purpose of learning includes going abroad or looking for a job (see Fig. 5).

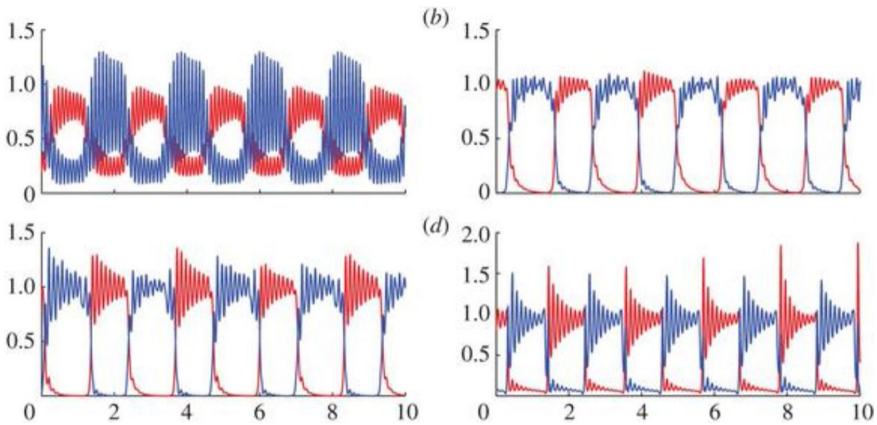


Fig. 5. Simulation for teaching evaluate system with data mining

### 5 Summary

To sum up, through the practical research on the quality of college English teaching, relevant researchers can find out many elements that affect the quality of English teaching, and use data mining technology to accurately find out the importance of all kinds of elements. Make college English teachers understand the current teaching situation, its teaching innovation also has stronger pertinence.

The analysis method of College English teaching quality based on data mining provides a new technical route for the construction of teaching quality index system.

This method uses data mining technology to find hidden, difficult to find but valuable information of teaching quality influencing factors from a large number of data covering College English teaching process, conditions and environment. The classification order of CHAID decision tree reflects the importance of the factors that affect the quality of teaching. Through data mining, it is found that the most important factors affecting the learning progress rate of the experimental sample group are “learning motivation”, “teaching method” and “teaching mode”. This method can make up for the subjective defects of the traditional teaching quality indicators, and provide a more objective basis for the construction of teaching quality system.

This method is helpful to provide targeted improvement strategies for teaching quality. Each node of Pmnp decision tree is a specific classification group, which reflects the quantitative effect of various factors on Pmnp. It allows analysts to directly observe the quality of English Teaching under different factors and environments (such as teaching mode, teaching means, teachers’ education background), so as to compare the advantages and disadvantages of various teaching measures or their applicability to different student groups. It provides an intuitive and solid basis for proposing targeted improvement measures.

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