



The Predicament of College English Curriculum Education Reform under the Background of Big Data and Internet of Things

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Abstract: Under the influence of the rapid development of various electronics and data science, software technology has also made great progress. Among them, big data and Internet of Things technologies have developed particularly rapidly, and big data and Internet of Things technologies have gradually become mainstream technologies in this era. The Internet of Everything and data prediction have brought convenience to technological innovation in various industries. Teaching innovation in colleges and universities has always pursued the integration of the latest technology into the teaching process of colleges and universities. Curriculum reform is an important way of college innovation. An important trend of the current university curriculum reform. In order to study the current predicament of college English curriculum reform, this paper distributed corresponding questionnaires to teachers and students of English departments in 35 universities by means of questionnaires distributed on the Star Online. It is concluded that the current predicament of college English curriculum teaching and reform mainly includes the mismatch between training objectives and teaching mode, the untargeted teaching content and the single teaching evaluation mode, and combined with big data and Internet of Things technology to solve the current predicament of college English curriculum reform The plan was designed, and through secondary visits to the colleges and universities surveyed in the previous period, it was found that after the college process curriculum reform combining big data and Internet of Things technology, the students' learning efficiency has been greatly improved, and the teachers' sense of course burden has also decreased.

Keywords: College English Curriculum Reform; Big Data; Teaching Innovation

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1. INTRODUCTION

1.1. Big Data

The standard definition of big data by scholars in recent years is to search and make decisions based on massive data sets, and the data that can be used for analysis is the internal data of big data [19]. Big data is the data that cannot be captured, managed and processed within a specified time using general software tools [25]. This information data must be processed by a new processing model for diverse and massive information resources [16]. This model has more powerful decision-making, insight and process optimization capabilities [17]. At present, big data is widely used in education, business, science and other fields, and university curriculum reform is one of the fields of application of big data technology [27]. Realize the concept of course data analysis serving teachers and students. Institutions predict the development trend of big data technology as shown in Figure 1.

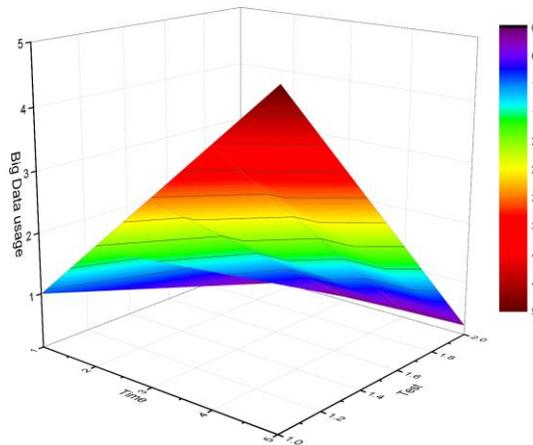


Figure 1: The development trend of big data.

1.2. Internet of Things

With the rapid development of electronic components and data science and technology, IoT technology has gradually entered the lives of citizens [18]. The concept of the Internet of Everything is no longer empty talk, and smart homes have become a must-have smart device for most homes [32]. The IoT system is divided into three layers: the first is the application layer, which provides readable and actionable data to IoT users based on the data collected by the sensing devices and the data processing results of the server [28]. Common applications such as IoT, Internet of Vehicles, etc. [5]; The second is the network layer, which communicates between devices through the Internet [31]. The layer that carries the communication between the devices is the network layer, and the key technologies include Bluetooth, WIFI, etc. [7]; Technologies include GPS, RFID, etc. [28]. At present, the most closely integrated IoT technology and human life is the body area network, which designs various IoT technologies into personal wearable devices to obtain various physiological data of the human body, and finally realize human health detection [12].

1.3. The Need for College English Curriculum Reform

Our country is currently in a new stage of rapid development. The exchanges and integration with the world are becoming more and more extensive and in-depth, and the role of English talents is becoming more and more important [8]. Although my country's higher education is gradually

popularized and many English talents are cultivated, most of the talents cultivated cannot keep up with the new development requirements of economic society and foreign trade enterprises in the new era, resulting in a shortage of English talents [14]. On the other hand, with the continuous development and deepening of the current global political, economic and financial integration, the economic cooperation between countries has become more and more closely linked, which not only promotes my country's economic development, but also lays a foundation for the employment of graduates in various colleges and universities [21]. There is a great social demand for high-level and high-quality English talents, but the talents trained by actual colleges and universities have insufficient English ability [22]. In order to solve the problem of insufficient English ability of current college graduates, from the perspective of English curriculum reform, students' learning Ability to cultivate and change the teaching methods of college teachers [24].

2. QUESTIONNAIRE SURVEY AND ANALYSIS

In order to study the current predicament of college English curriculum reform, this paper distributed corresponding questionnaires to teachers and students of English departments in 35 universities by means of questionnaires distributed online. Whether the content meets the needs of students and the teaching evaluation mode, a total of 7,000 questionnaires were distributed, and 6,980 valid questionnaires were recovered, with a recovery rate close to 100%. Among them, the teaching mode of college English course is related to teachers' personal tasks and students' course experience, which is particularly important for the reform of college English curriculum. This questionnaire selects three typical college English teachers from three different schools to make key statistics. The specific data display of the course teaching mode is shown in Table 1.

Teacher	Course teaching mode	Students' knowledge acquisition degree	Matching degree with training objectives
A	No question and answer	0.29	0.11
B	Most of the multiple choice questions	0.28	0.14
C	No innovation	0.26	0.16

Table 1: Teaching mode of college English courses.

From the data in Table 1, it can be seen that the current curriculum teaching mode has a low degree of matching with college English training objectives. The three English teachers surveyed all believe that the current college English curriculum teaching mode has problems. The matching degree of the target is only 11%. In addition, the teachers know the students' knowledge acquisition level through the students' course performance. All three teachers believe that under the current college English course teaching mode, the students' knowledge acquisition degree does not exceed 30%. Among them, the C English teacher only 26% of students think that students' knowledge acquisition level. The rationality of the teaching content of college English courses and whether it is pertinent will determine the learning effect of students. The data of three typical students are selected for this questionnaire survey. The specific conditions are shown in Table 2.

Student	The rationality of the teaching content	The pertinence of the teaching content
A	0.21	0.31
B	0.23	0.33
C	0.19	0.27

Table 2: Rationality of teaching content of college English courses.

From the data in Table 2, it can be seen that the three typical college students surveyed believe that there is a problem with the rationality of the current college English course teaching content. The current teaching content of college English courses is not targeted. Through the questionnaire survey, we can have a basic understanding of the current application status, but the validity and reliability of the questionnaire survey can only be found in the actual test. This paper obtains the correlation coefficient of the questionnaire in this paper through the theoretical analysis of reliability and validity, as shown in the table below.

	reliability	validity
value	Alpha=0.82	KMO=0.88

Table 3: Reliability and validity analysis.

It can be seen from Table 3 that the data of this questionnaire survey are real and effective, and in line with the actual situation, so the results of the survey and analysis are believed to be valid. Teaching evaluation is related to the effective feedback of teachers and students' teaching effect. It is the actual display of teaching results and a key indicator of targeted teaching for students. This questionnaire survey selected three typical teachers for key observation. The data display of English course teaching evaluation is shown in Table 4.

Teacher	Satisfaction with teaching evaluation	Whether to use auxiliary tools
A	0.25	NO
B	0.16	NO
C	0.18	NO

Table 4: Teaching evaluation of college English courses.

It can be seen from Table 4 that the three college English teachers surveyed have low satisfaction with the current teaching evaluation methods of college English courses. Among them, the satisfaction of B English teachers is only 16%, which is the lowest evaluation among the three English teachers, while A is the lowest among the three English teachers. The evaluation of English teachers is the highest, but their satisfaction is only 25%. Through the teaching evaluation survey of the three teachers, it can be found that none of the three teachers have teaching evaluation aids, so it can be imagined that the three typical college English teachers in the course. There are also problems with the accuracy of teaching evaluation. Through the questionnaire survey, we can have a basic understanding of the current application status, but the validity and reliability of the questionnaire survey can only be found in the actual test. This paper obtains the correlation coefficient of the questionnaire in this paper through the theoretical analysis of reliability and validity, as shown in the table below.

	reliability	validity
value	Alpha=0.87	KMO=0.82

Table 5: Reliability and validity analysis.

From Table 5 and the actual questionnaire reliability theory, it can be seen that the data of this questionnaire survey is real and effective, and it is more in line with the actual situation, so it is believed that the survey and analysis results are valid.

In order to analyze the data collected by the questionnaire, this paper adopts the big data related algorithm for data processing, and the involved formulas are shown in (2.1) - (2.5).

$$R(\zeta_t, \omega_t, b_t) = \begin{cases} X_m L_s (1 - P_e)^{X_m L_s} / T_p & , \omega \neq 0 \\ 0 & , \omega = 0 \end{cases} \quad (2.1)$$

$$y_t = r(s_t, a_t) + \gamma Q(s_{t+1}, \mu(s_{t+1})) | \theta^Q \quad (2.2)$$

$$P_e(\zeta_t, \omega_t, b_t) = \sum_r \alpha(m, r) \cdot \frac{1}{2} \operatorname{erfc} \left(\sqrt{\frac{\beta(m, r) \omega_t \zeta_t}{2N_0 T_L}} \right) \quad (2.3)$$

$$Q'(s_t, a_t) = \mathbb{E}_{r_t, s_{t+1} \sim E} \left[r(s_t, a_t) + \tau [Q'(s_{t+1}, \mu(s_{t+1}))] \right] \quad (2.4)$$

$$\frac{(\omega / T_L) \zeta_{rd} + \Psi_s \zeta_{sd}}{N_0} \quad (2.5)$$

3. THE CURRENT PREDICAMENT OF COLLEGE ENGLISH COURSE TEACHING AND REFORM

3.1. The Training Objectives do not Match the Teaching Mode

The teaching goal of college English courses is to train students to become English lovers who are self-questioning, innovative and critical [29]. Through the survey of questionnaire data, it is found that there is a big gap between the current teaching mode of college English courses and the training objectives [2]. For example, the course involves the assessment of students. Most textbooks and exams are conducted in the form of multiple-choice questions [20]. This method allows students to cope with the exam by rote, and cannot achieve the goal of cultivating critical thinking ability. In addition, the goal of college English courses requires students to have an innovative spirit, but in fact, the current college English course teaching lacks the cultivation of innovative spirit, requiring students to have the ability to ask questions [13]. In the actual course teaching, because the college English course classes are composed of more than 30 college students, teachers. In the 45-minute classroom time period, the feelings of each student cannot be taken care of, and the students' knowledge acquisition level is also poor in this situation, which eventually leads to high pressure on teachers and poor learning effect of students [4].

3.2. The Teaching Content is not Targeted

Interest is a key element of student learning, and the same is true for college English courses [6]. However, the questionnaire survey data shows that current college students believe that the teaching content of college English courses is not reasonable enough, and the teaching content is not targeted. The reason for this problem itinerary is that university teachers cannot effectively obtain the actual learning needs of college students, and can only teach according to the teaching objectives of the English course and the teaching arrangements of the English department. In fact, the teaching content does not match the actual needs of students. In response to the problem of inconsistent teaching content, colleges and universities, as the forefront of scientific research, have not been able to provide reasonable solutions [30]. The final result is that teachers still use traditional teaching content to teach, and students' interest in the classroom gradually decreases, resulting in boredom [3].

3.3. A Single Teaching Evaluation Model

The current teaching evaluation mode of college English courses is mainly based on the final English course test scores of college students and the usual classroom scores. In fact, the English foundation and interest of college students are different, and evaluation only based on the results is not suitable for all students [9]. There are some college English students with poor English foundation in high school, but they work very hard in college English courses, but the results are not ideal. In this case, the students' efforts should be paid attention to [23]. In addition, other courses have begun to use a diversified evaluation model to evaluate students' learning. However, college English courses still use a relatively single evaluation model [14]. However, the college English classroom does not pay attention to the use of scientific auxiliary tools, which is an important reason for the dissatisfaction of college teachers caused by the current teaching evaluation mode of college English courses in colleges and universities [11].

4. COUNTERMEASURES FOR COLLEGE ENGLISH CURRICULUM REFORM BASED ON THE BACKGROUND OF BIG DATA AND INTERNET OF THINGS

4.1. Cultivation Plan Combined with Internet of Things Technology

The Internet of Things technology has various branches. Sensor technology belongs to the mainstream of IOT technology. In the past two years, sensor technology has gradually developed into portable devices [10]. Portable headphones, watches, necklaces and other devices have become the current trend of wearing electronic devices. To solve the problem that the current teaching mode of college English courses cannot match the training objectives, we can consider increasing the expenditure of college English courses, and install sensors on the desks of each college English classroom [1]. Teachers can obtain real-time body signals of students during the teaching process. The transmitted body signals, and then choose question-and-answer opportunities according to the overall physical condition of the students, increasing the opportunities for students to improve their question-and-answer ability in college courses. In addition, the application of sensor technology to college English courses is also conducive to students' learning of the latest technology and the cultivation of students' innovative ability. Target match. Through the second visit to the teachers of the English department of colleges and universities surveyed in the previous period, it is found that after the teaching mode of college English courses is updated with the Internet of Things technology, the degree of knowledge acquisition of students has been greatly improved. The specific situation is shown in Figure 2.

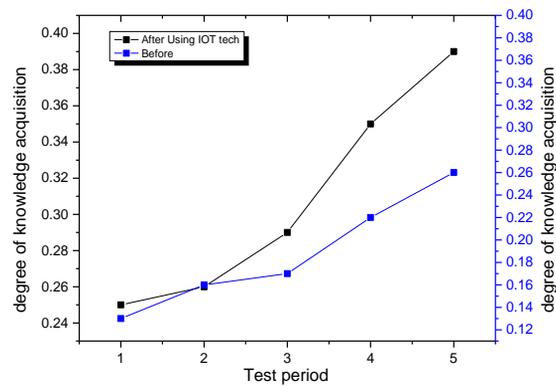


Figure 2: Changes in students' knowledge acquisition level.

After the combination of the Internet of Things technology, the matching degree between the actual teaching of college English courses and the teaching objectives of the course has also been greatly improved. The specific situation is shown in Figure 3.

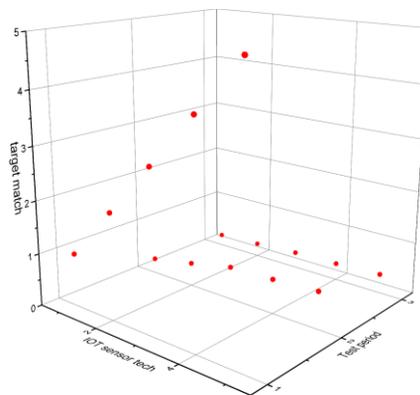


Figure 3: Changes in the matching degree of teaching and training objectives.

4.2. Recommendation of Targeted Teaching Content Combined with Big Data Technology

At present, big data technology in the business world can already realize the function of recommending users' preferences, and the recommendation for the content of learning interests of college students can also be realized through big data technology. In order to solve the problem that the current teaching content is not targeted, a separate big data analysis platform can be established for each university. The back end of the platform can design a separate database for students and teachers, enter students' personal information and interests into the database, and record each section. The interest points of the students in the course are finally combined into a large student data set, and the student database is combined and analyzed through big data analysis tools such as hadoop and spark to finally determine the students' interest and preferences in teaching content, and automatically send the preferences to college English teachers. Teachers organize their own courseware based on students' interests, and finally improve the pertinence of teaching content

through the integration of two-way information. Through the arrangement of this process, students' interest in learning has been greatly improved. The specific situation is shown in Figure 4.

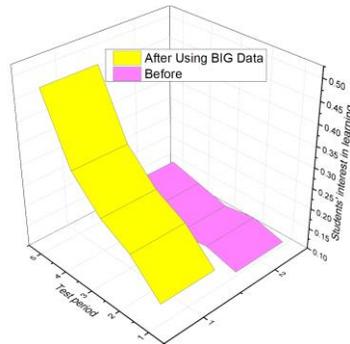


Figure 4: Changes in students' interest in learning.

4.3. Design of Teaching Evaluation Model based on Big Data Technology

In order to solve the single problem of the current teaching evaluation model in colleges and universities, the data analysis function of big data technology can be used to analyze all behavioral data in the entire teaching process to obtain effective teaching evaluation. The basis of this behavioral analysis is data. Therefore, it is necessary to establish a college English course teaching evaluation database first, collect the teaching data of teachers and students in each classroom, and then comprehensively analyze the teaching situation to find out the problems of teachers' teaching and students' learning efficiency in time, and Let the database continue to add the latest foreign language teaching evaluation model data at home and abroad, let the teaching model evaluation system also learn in the process of sorting out the data, and constantly provide suggestions for teachers' teaching evaluation methods, and finally optimize the teaching evaluation model, thereby improving Teachers' teaching confidence, and effective evaluation of students' college English course learning. Through the second visit to the colleges and universities in the early stage, it is found that after the teaching evaluation model is designed by big data technology, teachers' recognition of the teaching evaluation in colleges and universities has been greatly improved. The specific situation is shown in Figure 5

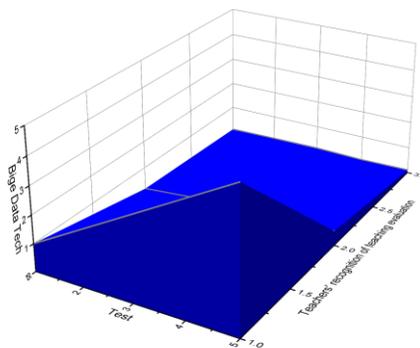


Figure 5 :Changes in teachers' recognition of college English course teaching evaluation

5. CONCLUSION

Big data technology can make predictions and inferences based on previous students' learning experience data, and obtain the best learning route for students, while IoT technology can obtain students' physical status and learning status information in real time through some personal IoT devices, and then combine them. Big data analysis and changes in the display of teaching content based on students' learning effects. The two technologies complement each other and become a favorable tool for the current reform of English courses in colleges and universities. In order to study the current predicament of college English curriculum reform, this paper distributed corresponding questionnaires to teachers and students of English departments in 35 universities by means of questionnaires distributed on the Star Online. It is concluded that there is a dilemma in the current teaching and reform of college English courses, and corresponding solutions are designed using big data and Internet of Things technology. Through the second visit to the colleges and universities surveyed in the previous period, it was found that after the reform of the college process curriculum combined with big data and Internet of Things technology, the current reform dilemma has been solved.

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Data Availability Statement: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest: It is declared by the authors that this article is free of conflict of interest.

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