

Construction and Application of the BEST Teaching Mode of College English in Big Data

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Abstract—The widespread use of the Internet and Internet-based devices allows people to access big data easily. With the emergence of big data, the traditional teacher-centered teaching modes can no longer arouse the learning interest of students and cannot satisfy the needs for their overall improvement. A creative and comprehensive teaching mode based on big data environment for students and teachers (BEST) teaching mode was proposed in this study to enhance the teaching effect of teachers and the learning efficiency of students in big data. The challenges brought by big data were analyzed in this study, and a corresponding BEST teaching mode was proposed based on big data. A case study was conducted, in which the BEST teaching mode was applied to college English teaching. SPSS19.0 was used to analyze the results of the experiment. Results demonstrate that the proposed BEST teaching mode allows students to select suitable materials and methods to study and that the proposed mode fundamentally changes the nature of teaching and learning. Findings reveal the many advantages of this mode for both the College English teaching and college English learning. The proposed novel BEST teaching mode plays a significant role in guiding the revolutionary change in the mode and the means of foreign language teaching reforms in China.

Keywords—BEST teaching mode, College English, Big data

1 Introduction

With the rapid improvement of modern science and technology, great changes have occurred in knowledge creation, knowledge storage patterns, and the manner of learning and using knowledge. The Internet has gradually become one of the most important means for people to acquire knowledge, be engaged in work, understand the world, and communicate with one another.

In 2004, the “College English Curriculum Requirements” proposed by the Ministry of Education affirmed computer-based teaching modes. Moreover, regulated new teaching patterns should be associated with modern information technology, especially Internet-based devices to make English teaching and learning easily accessible. However, traditional teaching methods are mainly teacher-centered, which cannot promote the learning interest and efficiency of students; thus, teachers cannot improve

their teaching efficacy. Big data, with enormous values, is an important strategic resource that can be applied in various areas, especially in college English teaching and autonomous learning of students and their practical applied ability in using English. With the flourishing of big data, the reforms in college English teaching modes must be college and student-centered and the college English syllabus should be adapted to its educational purposes and advancement in the big data era. Therefore, this study proposed a creative and comprehensive teaching mode based on big data environment for students and teachers (BEST) teaching mode, in which the curriculum designs and teaching modes, contents, requirements, and management could be in accordance with college-centered teaching.

2 State of art

The computer network technology and its integration with college curriculum are profoundly influencing and changing the environment of various subjects, heralding their development in the future [1]. With the innovation in Internet technology, the age of big data has emerged and revolutionized the entire society. Big data technology has also penetrated the core of education, thereby revolutionizing the thinking of educators, influencing the education mode of schools, and reconstructing education evaluation.

The big data era was first proposed by McKinsey, a global consultancy firm. According to McKinsey, Data, penetrating into every industry and business today, has become an important production factor. People's mining and using of huge amounts of data indicates the arrival of a new wave of productivity growth and consumer surplus wave [2]. The US Internet data center defined "big data" as a new type of technology architecture that obtains value from a large capacity of data through high-speed capture, discovery, and analysis [3].

In the past few years, numerous studies on resources from big data and its application in foreign language teaching or learning have been conducted. In terms of theoretical foundations, the theories of modern foreign language teaching and learning and those of modern educational technology assist foreign language teaching and learning, such as the theories on behavior learning, cognitive learning, constructive learning, humanistic learning, Bruner's discovery learning, information processing, and communication. These theories were proposed as the theoretical guidelines for the field teaching and learning practices with integration of multimedia technology [4].

Theoretically, the integration of computer network with curriculum is the consideration and operation of course setting, teaching target, teaching design, teaching evaluation and other factors. Thus, the relationship among the various elements should be understood and studied in an overall, related, dialectical point of view, and its connotation is a new and efficient way of foreign language teaching to integrate information technology, information resources, and information methods with the course contents in the process of foreign language teaching organically, and to complete teaching tasks [5].

In sum, a considerable number of Chinese and foreign teachers and researchers have made tremendous efforts to study the appropriate application of a large number of resources from big data to foreign language teaching and learning in actual situations and the special characteristics of English teaching and learning. However, the above studies did not comprehensively combine the information of big data with College English teaching comprehensively. Big data is a disruptive technology reform as information technology was after the cloud computing and Internet of things in the IT industry. Through the exchange, integration, and analysis of large data, new knowledge can be discovered, new wisdom can be improved, and new values can be created. Therefore, in the present study, a comprehensive teaching mode was proposed. In this teaching mode, college English teachers should exploit the mass information provided by big data and apply it to foreign language teaching comprehensively to promote comprehensive ability of students and teaching efficiency of teachers. The remainder of this study is organized as follows.

3 Methodology

3.1 Construction of College English Teaching Modes Based on Big Data

In the field of foreign language learning, the learners and the computer have actually formed a society of man and machine (see Table 1).

Table 1. Correlation between Human and Computer

Development of computer technology	Computers	Users
Large computer	One computer	Many users
PC	One computer	One user
The Internet	Many computers	Many users

With the advent of the Internet, a sea of information, data, and sources have flooded into people’s lives. Many learners can surf the Internet and operate on it to share computer hardware and software and information resources that are connected online; thus, the man–machine pattern has become “many users, many computers” pattern. Learners can now obtain any learning material they need through computers via wireless networking at any place and time.

The construction of college English teaching modes based on big data aims to personalize English teaching and activate English learning without being restricted by time and place. The teaching modes should reflect the practicality of English teaching and integration of culture and learning interests. Technically, this type of English teaching should be realized and utilized easily. In addition, it should be able to arouse the enthusiasm of teachers and students fully. That is to say, the teaching modes should exploit modern information technology; simultaneously, the modes should fully consider and absorb the advantages of the existing teaching modes and fully embody the principles of reasonable inheritance. New college English teaching modes

should have the development direction of combined classroom teaching and online English teaching software on campus [6].

In the era of big data, the teaching of simple language knowledge in the classroom needs to be transformed into the concrete language application. The students should be guided to have the ability to discuss and explore the real life issues, and to improve the practical application of knowledge. Therefore, the evaluation of teaching also needs to be changed too, and should be analyzed according to the big data [7]. Meanwhile, many studies showed that to explain the general learning, people’s thoughts, beliefs and emotions should be taken into consideration [8].

Accordingly, a creative and comprehensive teaching mode based on BEST teaching mode was proposed in this study (see Fig. 1). In this new teaching mode, the teacher’s role shifts from that of instructor to that of facilitator. Teachers suggest various activities that students might want to engage in and provide assorted materials for them to use. The students, however, not the teacher, makes the final choice. Self-regulation of learning has a powerful effect on students’ motivation to learn.

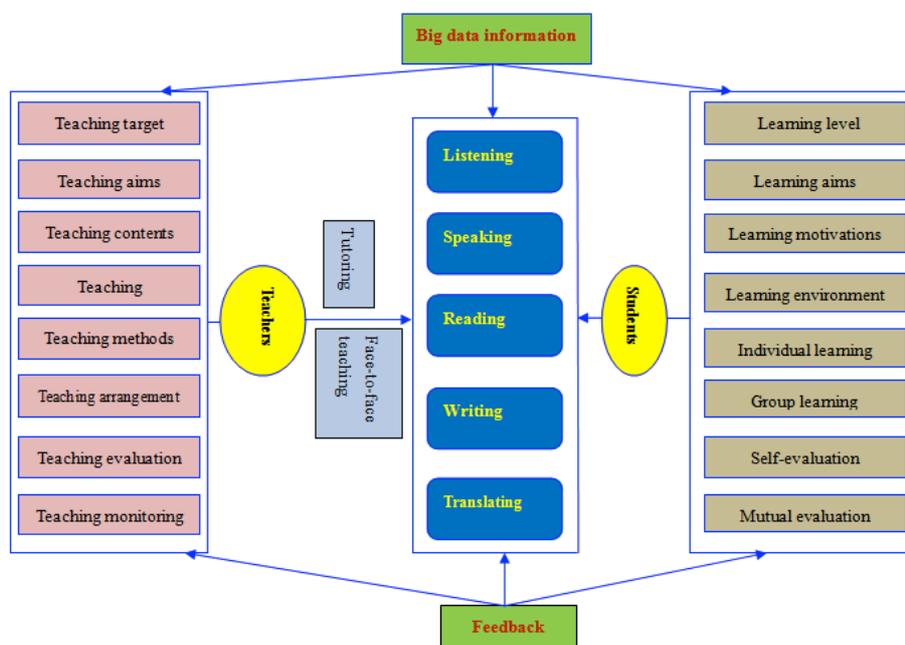


Fig. 1. the BEST teaching mode.

In this mode, teachers should fully utilize the big data from modern information, especially the Internet, to enhance the traditional teaching mode, which can make English teaching and learning not limited by time and place to a certain extent. This mode will also promote individualized and autonomous learning by students.

The network teaching system covers a complete process of teaching, learning, feedback, and management, etc. Teaching activities, such as listening, speaking, writing, reading, and translating, can be performed by computers or through classroom

teaching. Learning includes learners' level, learning objectives, motivations, and environment, individual and group learning, and self- and mutual evaluation. Teaching includes teaching targets, objectives, design, contents, environment, arrangement, and evaluation, monitoring management of student autonomous learning, and teachers online tutoring. In the course of teaching, teachers are the organizers of the teaching activities, and teaching management is performed by the academic affairs department, teachers, and computer management software.

The system can also record and test teaching and learning and make teachers and students know the results anytime and anywhere. Meanwhile, the knowledge sources of students not only come from single papers and textbooks in classroom teaching but also from the information from big data.

3.2 Application of the BEST Teaching Mode in College English Teaching

Objective and Subjects of the Experiment. This experiment aimed to examine the rationality and feasibility of the BEST teaching mode and provide the basis and strategies for the reform of college English teaching in Harbin University of Science and Technology. The experiment would answer the following questions: Was this teaching mode beneficial to improve students' ability in listening and speaking, English comprehensive application, and autonomous learning? Did it have a positive influence on the attitude of students toward learning English?

The experimental classes consisted of 116 people in two classes of non-English majors in Harbin University of Science and Technology. Through the analysis of English entrance examination scores, two classes with 111 students were selected as the control classes to validate the results; the control classes have no significant difference from the experimental classes.

Measuring Tool. The measuring tools were language testing and questionnaire of teaching effect in Viewing, Listening, and Speaking of college English. All the experimental and control classes participated in the test. Before the experiment, both the experimental and control classes participated in the "self-made model test of CET 4" (March 2016). The listening grades (overall grade of 30 points) and comprehension grades (overall grade of 100 points) were considered as pre-test grades. Mid-test grades included the listening grades (overall grade of 30 points) and comprehension grades (overall grade of 100 points) of the final English test for New Horizon College English (July 2016). Post-test grades included the listening grades (overall grade of 249 points) and comprehension grades (overall grade of 249 points) of CET4 (December 2016). In addition, the CET speaking tests included the pre-test (July 2016) and post-test (December 2016), with an overall score of 15 points. The criteria for speaking tests were the same with that of the CET speaking test. Each of the speaking tests had four examiners and 10 candidates. Two of the examiners had participated in the evaluation of several CET tests and have considerable experience. The four examiners rated the 10 students accordingly to ensure the credibility of test scores. The results of the experiment showed highly correlated results, which indicates that the scores had high credibility.

Experimental Process

Table 2. Teaching Arrangement of the Experimental and Control Classes

Teaching contents	Modules and teaching allotment	Requirements
Experimental classes New Horizon College English I (Viewing Listening Speaking)	Autonomous listening classes guided by teachers: 45 min/week	Students should take advantage of the relevant resources provided in large data, complete necessary tasks before the class, familiarize themselves with the relevant expressions, and prepare for the language materials and information required in class.
	Speaking classes: 45 min/week	Students should actively participate in classroom activities, use the resources in big data, practice oral activities by making videos, and have group discussions and debates.
	Extracurricular autonomous learning: 90 min/week	Students should independently complete the selected tasks on any computer connected to the campus network, consolidate the contents of classroom teaching, and conduct personalized learning. Meanwhile, teachers should answer questions, tutor students, and check their assignment online using BBS, QQ, blogs, WeChat, or by other means.
Control classes New Horizon College English I (Viewing Listening Speaking)	Viewing Listening Speaking: 90 min/week	Students should complete the listening comprehension and oral activities mainly by using textbooks.
	Extracurricular autonomous learning: 90 min/week	Students use CD-ROMs attached to the textbooks to study autonomously. Teachers should check the answers in class.

4 Result analysis and discussion

4.1 Comparison and analyses of the pre-, mid-, and post-test results of the listening test of the experimental and control classes

Table 3. Pre-, Mid-, and Post-test Results of the Listening Test of the Experimental and Control Classes

Listening test	Group	Mean	Mean difference	P-value
Pre-test	Experimental classes (N=116)	14.369	-0.083	0.885
	Control classes (N=111)	14.452		
Mid-test	Experimental classes (N=116)	19.077	0.614	0.331
	Control classes (N=111)	18.463		
Post-test	Experimental classes (N=103)	155.682	9.531	0.013
	Control classes (N=96)	146.151		

The pre-test results showed that the listening level of the experimental and control classes was not significantly different before the experiment ($P=0.885>0.05$). After a semester of teaching, the listening level of the two groups of participants had improved; however, no significant difference existed between the two groups ($P=0.331>0.05$). At the end of the almost one-year experiment, the participants participated in CET 4 of December 2016. The average listening score of the experimental classes was 155.682, which is considerably higher than the average score of 146.151 of the control classes. Accordingly, significant difference was found in the post-test ($P=0.013<0.05$). Therefore, the BEST teaching mode has a great effect on improving the listening ability of students. In the process, various sensory interactions are beneficial to the internalization of knowledge and help the students confidently complete the listening task easily. Moreover, students pay more attention to various cultures and study them to obtain more successful communication.

4.2 Comparison and analyses of the pre-, mid-, and post-test results of the speaking test in the experimental and control classes

Table 4. Pre- and Post-test Results of the Speaking Test of the Experimental and Control Classes

Speaking test	Group	Mean	Mean difference	P-value
Pre-test	Experimental classes (N=116)	8.946	-0.025	0.861
	Control classes (N=111)	8.971		
Post-test	Experimental classes (N=116)	10.892	0.874	0.000
	Control classes (N=111)	10.018		

The average scores of the experimental and control classes were 8.946 and 8.971, respectively, and no significant difference existed ($P=0.861>0.05$). After the almost one-year experiment, the two groups showed significant differences in the speaking test ($P=0.000<0.05$). This result shows that compared with the students in the control classes, the students in the experimental classes have made more progress in speaking ability. Meanwhile, the oral English teaching in Harbin University of Science and Technology has not been given enough attention, and two hours of viewing, listening, and speaking classes in a week is insufficient to satisfy the desire of students to improve their listening ability. Problems, such as lack of English environment, uniformity of teaching contents, and single traditional teaching mode, make listening and speaking teaching difficult; thus, guaranteeing effective classroom teaching is also challenging. In this experiment, the mode provides students with a large amount of information and rich language materials, which effectively improve the oral English teaching effect and improve the intercultural communication competence of students.

4.3 Comparison and analyses of pre-, mid-, and post-tests of comprehension ability of the experimental and control classes

Table 5. Results of Pre-, Mid-, and Post-tests of Comprehension of the Experimental and Control Classes

Comprehension test	Group	Mean	Mean difference	P-value
Pre-test	Experimental classes (N=116)	57.113	0.955	0.218
	Control classes (N=111)	56.158		
Mid-test	Experimental classes (N=116)	69.349	3.132	0.022
	Control classes (N=111)	66.217		
Post-test	experimental classes (N=103)	193.886	28.854	0.024
	Control classes (N=96)	165.032		

In the pre-test, the experimental and control classes did not show significant difference in terms of comprehension ability ($P=0.218>0.05$). However, in the mid- and post-tests, the average scores of the experimental classes were 69.349 and 193.886, respectively, which are significantly higher than the control classes with the scores of 66.217 and 165.032, respectively. Their comprehension ability had significant difference ($P=0.022<0.05$ and $0.024<0.05$). The BEST teaching mode integrates auditory, visual, oral, and reading materials that are relevant to the subject matter and provides the students rich writing materials through listening and speaking, thereby balancing the input and output and systematization of teaching.

5 Conclusions

To enhance the teaching effect and learning efficiency in the era of big data and provide some guidance for college English teaching, the challenges brought by big data were analyzed. A corresponding BEST teaching mode was proposed based on big data. Furthermore, a case study was conducted, in which the BEST teaching mode was applied to college English teaching using SPSS19.0, to analyze the experimental results. The following conclusions were obtained:

1. The proposed BEST teaching mode enables students to choose the suitable materials and methods to study; thus, it can promote the formation of individualized learning methods and gradually improve their independent autonomous learning ability.
2. In the proposed teaching mode, fundamental changes occur in teachers and students. Teachers are no longer the center of classroom teaching. Instead, students have become the center and are no longer the passive knowledge receiver and they have become the active constructors of knowledge. Throughout the learning process, students have access to knowledge far beyond the scope of textbooks. Meaningful and active knowledge can be constructed in various ways.
3. This mode fundamentally changes the nature of teaching and learning. It breaks the limitation of the traditional teaching mode of “class + textbook” and created an

ideal teaching and learning environment. In addition, it fundamentally changes the teaching structure. This mode focuses on the teaching and practice thought to cultivate the language application and autonomous learning abilities of students, as well as their intercultural communication competence. It also cultivates the lifelong learning ability of students. In terms of teaching and learning elements, they have a two-way interactive, interdependent, and mutual relationship.

Based on the rich and abundant information provided by big data, a new BEST teaching mode was proposed according to College English Curriculum Requirements. This new teaching mode plays a significant role in guiding the revolutionary change in the mode and means of foreign language teaching reforms in China. However, the combination between big data information and college English teaching is still in the stage of development, and ready-made experience and practice are unavailable. Inevitably, some problems in the combination process will occur, such as in the manner of sharing multimedia teaching resources and teaching evaluation of the new teaching mode. Future research should strengthen the understanding of teachers of the combination of big data resources and teaching. The information literacy and level of teachers should also be improved, as well as their ability to implement teaching, to promote the development of college English teaching reform.

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