Research on Smart Teaching Model of College English Based on Big Data and Information Technologies

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Abstract. In recent years, the fast development of computer network, big data and information technologies has greatly changed people's way of learning and thinking and even has effectively accelerated the reform and innovation of education. Ubiquitous learning provides learners with a new way of learning anytime, anywhere, anytime, and its emergence brings new vitality and development to education. Through the screening and statistical research of related research, this paper analyzes the concept of smart teaching model and probes into two main types of smart teaching. Furthermore, the construction of smart teaching model of college English based on computer network, big data and information technologies and the effect of the model is clarified on the basis of the data analysis. In addition, the implementation of smart teaching model in college English is explained from three perspectives to stress the effectiveness of communicative and interactive learning method. Finally, the paper highlights the significance of smart teaching and explores some possible problems in the process of applying smart teaching model in college education as well as puts forward some suggestions on the further development of English education.

Keywords: modern information technology · smart teaching model · college English · ubiquitous learning environment

1 Introduction

With the rapid development of Internet intelligent technology, scholars at home and abroad are keen on how to combine information technology with teaching. Since the concept of Ubiquitous Computing was proposed by Mark Weiser in 1988, ubiquitous learning research has been a craze at home and abroad [1]. Foreign language ubiquitous learning technology is based on ubiquitous computing technology. It provides learning support services for foreign language learners through mobile terminals and servers that support learning anytime and anywhere. Ubiquitous learning is a kind of intelligent learning environment designed under the condition of ubiquitous modern network technology. In this environment, people can use any terminal to learn at anytime and anywhere. In China, ubiquitous learning research officially started from the 10th Global Chinese Computer Application Conference in Education held in Tsinghua University in

2006. In recent years, our research on ubiquitous learning has shifted from basic theory to applied research, focusing on its application in the learning process and learning mode.

The Guidance on Actively Promoting the 'Internet+ Action' clearly defines the development goals for the next three years and ten years, and further deepens the integration of the Internet with various fields of economy and society. Smart classroom teaching mode soon becomes a hot topic in information education research. At home and abroad, the research on smart classroom teaching model mainly includes the following two aspects: one is the comparative study on smart classroom teaching model and traditional classroom teaching model, which mainly uses mobile terminal equipment to achieve specific teaching goals and efficient, open and independent classroom teaching model; Second, it emphasizes learner-centered learning, believing that learning is a knowledge construction process that learners take the initiative to carry out, and in this process, teachers play the roles of active guidance and planner [2]. The shortcomings are that the current domestic research on smart classroom mainly stays at the theoretical level, and the practical application of smart classroom in the specific subject field of teaching needs further in-depth research. The curriculum system of many colleges and universities is still dominated by the traditional teaching model. The construction and application of the smart teaching model has not been realized. The reform of school education is still in its developing stage. The ubiquitous learning environment provides unprecedented support and convenience for the smart classroom teaching model. The seamless integration of the two can go beyond the limitations of the traditional teaching model and realize the innovation of the teaching model.

2   General Concept of Smart Teaching Model

Smart classroom is a new research subject in the current educational field, which breaks through the traditional teaching from teaching concept and teaching method, which has attracted more and more researchers' attention. Smart classroom has two meanings:

A. *Smart Classroom:* Smart classroom integrates advanced information technology (wireless network, cloud computing, mobile terminal, interactive all-in-one machine, artificial intelligence, etc.) into teaching to create a humanized, personalized and informationized learning environment [3]. Students can freely choose appropriate learning materials according to their own needs through their own mobile terminal equipment. Study and interact with teachers or peers at any time and place. In addition, big data analysis technology can also record students' learning trajectory, analyze their knowledge grasp, provide objective and scientific data, help teachers make accurate academic diagnosis, adjust their teaching strategies and content in a targeted way, which is beneficial to improve teaching efficiency.

B. *Smart teaching model.* If College English teaching is still stopped at the "speaking - listening" level, teaching philosophy and methods have not been changed in fact, it is difficult to get out of the current predicament. Smart education emphasizes the cultivation of intelligent talents, especially thinking ability and creativity. The teaching goal of smart classroom is to promote the development of students' advanced cognitive ability, thinking ability and problem solving ability. By establishing independent,

cooperative and exploratory learning mode, it triggers the participation, experience and interaction of learners, so as to realize knowledge acquisition and the improvement of thinking ability. Smart classroom is an organic integration of information technology, teaching resources, learning environment, teaching methods, thinking and ability cultivation.

3   Characteristics of Smart Classroom Teaching

3.1   Personalized Learning Needs

Smart classroom teaching of college English will be more targeted to meet the individual needs of students. It is more convenient and effective for hierarchical and group teaching to design different types of corpus, assignments and tasks. At the same time, demand-oriented personalized teaching method can better stimulate students' intrinsic learning motivation. Students with poor language level and weak learning initiative are no longer in the "marginal position" of class teaching. They can receive information and challenges according to their own needs, making learning an individual-led activity rather than a teacher-required activity.

3.2   Sharing of Abundant Teaching Resources

As a new network storage technology, cloud storage has the function of setting up a library with huge network learning resources on the smart education platform. Teachers put resources such as pre-class preview, teaching courseware and assignments of each class on the cloud, and students can access data anytime and anywhere through network terminal devices, realizing the centralization, opening and sharing of teaching resources. Cloud computing technology provides technical support for the storage and sharing of massive learning resources, and ubiquitous computing technology makes it possible to obtain learning resources anytime, anywhere, and it is easy to get various resources in accessible formats with the support of digital multi-screen interaction technology, such as smart phones, tablets, laptops, TV tablets and other devices. With the help of this function, learners can freely and flexibly share learning resources, forming the interconnection between terminal devices and synchronous display between different screens, so that learning resources and students' assignments can be shared between teachers and students, satisfying the functions of seamless integration of learning space across terminals and boundaries.

3.3   Diverse Teaching Activities

In Smart classroom, learning activities not only allow students to understand and acquire knowledge, but also cultivate their abilities in various aspects such as asking questions, participating actively, and solving problems. In Smart classroom, teachers and students are in a cooperative relationship, and both sides work together to complete teaching and learning tasks.

3.4   Real Practice of Language in Scenario

In a smart college English classroom, knowledge importing and experiencing is emphasized. Scenario practice can enhance the teaching effect. One of the goals of college English teaching is to enable students to use English in their study, work and life. Creating an environment for students to use language is a process that integrate theory into practice. Language learning emphasizes not only the memorization of content, but also the mastery and application of knowledge. Teachers use multimedia, game teaching, project-based teaching and other forms to provide students with opportunities of practicing language in use to improve language ability in practice.

3.5   The Cultivation of Innovative Thinking Ability

Smart classroom teaching model applies cooperative group learning and research-based learning methods. These new teaching methods can fully spark students' enthusiasm and initiative in English learning, so that students can constantly innovate their ideas and learn to summarize in the process of independent inquiry and learning, and find a set of learning methods suitable for their own. The smart classroom is an open and diversified classroom that enables students to effectively stimulate and develop their innovative thinking in such a teaching environment.

4   The Construction of Smart Teaching Model in College English

4.1   Smart Teaching Model

According to the guidance of constructive theory and cognitive theory, with the help of the new information technologies such as the Internet of Things, big data and artificial intelligence, we realize the informationizing and intelligence of classroom teaching environment, and a new smart teaching model of college English is constructed. The essence of smart college English teaching model is not to take modern information technology as a teaching aid and means, but to create a new type of information, intelligent learning environment suitable for effective teaching. An efficient smart classroom teaching model puts much emphasis on data-oriented teaching decisions, intelligent teaching resource sharing, intelligent teaching interaction and diversified evaluation mechanism, and advocates intelligent "teaching" and "learning", which is featured with "autonomy, inquiry, collaboration and innovation" [3]. This can not only give full play to the leading role of teachers in the teaching process, but also realize the principal position of students in the learning process. This is beneficial for students to cultivate their comprehensive ability and core quality with "wisdom", cultivate students' autonomous learning ability, teamwork ability, critical thinking ability and innovation ability, and truly realize the transformation of teaching structure: The traditional classroom teaching structure of "teacher-centered teaching classroom" has been transformed into "a learner-centered smart classroom" (Fig. 1).
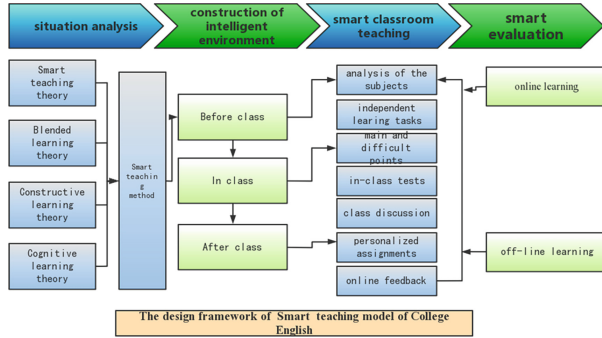
Fig. 1. Smart Teaching Model of College English

4.2 Teaching Process

The smart teaching model makes effective use of the ubiquitous smart learning environment and realize the effective integration and unity of "teaching" and "learning". Its overall teaching process is mainly composed of three teaching stages: "pre-class stage", "in-class stage" and "after-class stage", forming a closed-loop circle of three-stage classroom teaching. Smart teaching model effectively integrates and manages ubiquitous learning resources to form a trinity information teaching environment of teaching, learning and management, characterized with "multimedia, multi-form and diversified". In addition to traditional learning resources, ubiquitous learning resources also include digital learning resources, mobile learning resources, micro learning resources, etc. which are characterized by accessibility, intelligence, scenario, timeliness and dynamic.

In a smart teaching model, the teaching tasks in the pre-class stage mainly focus on the analysis of learning situation. According to the modern intelligent information platform, teachers can obtain real-time and dynamic data to make an accurate analysis of learning situation, which is conducive to teachers' perfection of teaching design and the real implementation of intelligent teaching based on learning. First, with the help of smart classroom information technology platform, teachers can accurately grasp the basic information of learning conditions in the ubiquitous learning environment, help teachers preset teaching objectives in line with the actual teaching conditions, and post preview content on the intelligent technology platform including preview courseware, video, audio, test questions, etc. Second, students can conduct ubiquitous and fragmented learning according to the teacher's preview task on the intelligent platform, and complete and submit corresponding tasks. Third, teachers and students can break through the time-space restrictions of "teaching" and "learning", communicate at any time, find problems and make intelligent decisions. Fourthly, according to the comprehensive digital analysis of learning situation, teacher can appropriate teaching design.

The in-class stage of smart teaching model is mainly characterized by dynamic and diversified teaching interaction and consists of teacher's teaching and classroom discussion. It integrates smart classroom information technology means and platform throughout the whole process of "teaching" and "learning", setting up diversified interactive activities, designing diverse learning situations and collaborative, exploratory and divergent learning tasks. Personalized in-class testing, targeted evaluation and feedback,

effective expansion and improvement, give full play to the advantages of smart teaching, further promote the interaction between teachers and students, cultivate students' teamwork ability, language application ability and interpersonal communication ability, strengthen the cultivation of students' innovative thinking ability, and achieve the goal of meaning construction and wisdom ability cultivation.

The after-class stage of smart teaching mode is based on the integration of personalized learning and tutoring. In the ubiquitous intelligent teaching environment, with the support of the "cloud + end" information technology of smart teaching, students can choose the personalized, fragmented and ubiquitous learning form that conforms to their own condition and habits, which is conducive to deepening learning, divergent thinking and meaning construction, which is the necessary prerequisite for carrying out "effective classroom discussion". In addition, according to the dynamic, visual, all-round and multi-dimensional analysis of the learning situation based on intelligent teaching information platform, teachers can post targeted personalized assignment, effectively changing the traditional evaluation form of uniform and unified standards.

4.3   Evaluation Mechanism

Teachers can use the ubiquitous network, cloud computing, artificial intelligence and big data to adopt a sustainable, dynamic, multi-dimensional and diversified evaluation method that combines formative evaluation, performance evaluation and comprehensive evaluation to carry out real-time monitoring, comprehensive and intelligent evaluation on the whole process of learners' learning. Moreover, teachers can use advanced digital information technology to monitor and master the dynamic data of students in the whole teaching process in real time, which is conducive to the comprehensive analysis and research of students' knowledge mastery, actual learning difficulties and needs, and various ability cultivation needs, so as to fully understand the overall learning situation and effect of students, and effectively judge individual differences. In order to improve the teaching effect, we should adjust the teaching methods and strategies in time. The diversified teaching evaluation means throughout the whole teaching process can more truly reflect the comprehensive learning situation and effect of students, help teachers to have a deeper understanding of students' knowledge and skills, learning methods, emotional attitudes and values, improve the effectiveness of teaching evaluation, and also help teachers to provide reference for future teaching design.

4.4   Research Methodology and Data Analysis

The paper conducts a questionnaire among two classes of sophomore in Ordos Institute of Technology as respondents, investigating students' attitude towards Smart Teaching Model based on ubiquitous learning environment and their opinions on the efficiency of such new teaching model. As for the influenced factors of the learners' attitude, the higher the score is, the more agreement with the view of given statements. Cronbach's Alpha reliability value is 0.968, beyond 0.9, indicating that the reliability value of the questionnaire data is valid, that is to say, it can meet the demands of questionnaire design for research.

Part II Evaluation of learning effectiveness
Average score: 3.91

Title\items	Strongly agree	agree	neutral	disagree	Strongly disagree	Average score
Smart teaching model has improved my learning efficiency.	98(31.82%)	116(37.66%)	80(25.97%)	1(0.32%)	13(4.22%)	3.91

Fig. 2. Chart 1

As seen from Chart 1 (Fig. 2), the average value of respondents' answers to the seven statements about students' attitude towards Smart Teaching Model is 3.91. More than two thirds of the learners agree with the opinions expressed in the statement, and the higher the recognition degree of the smart teaching model. This indicates that most of students are willing to accept such new teaching model and highly agree the advantages brought by the model. Based on ubiquitous learning environment, the model can make up for the deficiency of traditional classroom teaching.

It can be seen from Chart 2 (Fig. 3) that the advantages of smart teaching model is illustrated with percentage of agreement from the learners. As for the convenience of the new learning model, there are more than ninety percent of students agree with its easier access of learning, learning anytime and anywhere, and most of participants admit smart teaching model has brought more advantages to their study. It indicates that learners have a positive attitude towards learning effect and a higher approval of its efficiency. According to analysis of research data, it can be found that the majority of students benefit from Smart Teaching Model based on ubiquitous learning environment, their independent-learning ability, and the cooperation ability are improved. It is clear that most of the learners improved their English learning efficiency with the help of the new teaching model.

Part III The Advantages of Smart Teaching Model

Items	subtotal	Account for
A. Study time and place are not restricted	40	90.91%
B. Plenty of good learning resources	37	84.09%
C. It is accessible by the use of smart platforms such as mobile phones, apps and computers.	33	75%
D. It is helpful to cultivate students' autonomous study	19	43.18%
E.The forms of learning are diversified: personalized and intelligent	22	50%
F. Variety of evaluation on learning	19	43.18%
G. It is convenient to communication for teachers and students	15	34.09%
H.It is a complement of traditional classroom study	17	38.64%
The total number of participants	44	

Fig. 3. Chart 2

5   The Implementation of Smart Teaching Model in College English

The key to the implementation of smart classroom teaching is interactive teaching, that is, the classroom teaching process is regarded as a dynamic process of integration and interaction of teaching and learning, which is centered with the three-dimensional interactive communication ability. In the process of teaching interaction, it emphasizes that students are the subject of learning activities, and teachers are the mentors, helpers and promoters of students' learning. Different from traditional interactive teaching, it is not only the language exchange and discussion between teachers and students, but the most fundamental difference is that it realizes three-dimensional, efficient and continuous interaction between teachers and students with the help of intelligent mobile learning tools and learning platforms. The interactive teaching of smart classroom is reflected in the whole process of students' learning and development.

5.1   Interaction in the Process of Obtaining Resources

The resource management and service system based on the information technology platform of smart classroom can provide a variety of resources. However, in the interactive process, students are inclined to be lost in enormous information resources and cannot find the most beneficial teaching resources for their learning, thus it causes distractions for students to learn effectively, and influences the teaching process. Therefore, when teachers post learning materials online, they should pay attention to tracking, and adopt real-time guidance, prompts, questions in order to form an efficient interaction in the stage of students' information acquisition.

To be specific, the following measures can be taken: a. Teachers can give students relevant guidance on the collection of learning resources before the implementation of teaching or in the process of searching materials, so that students know where to search, how to search, what keywords to search, etc. b. Teacher can timely display the information collected by students and see which one is more effective and valuable by comparison. c. Let the students summarize their views on the information collected and share them in the class. Students post the information they have collected, sorted and summarized, on platforms. Teachers can learn about students' acquisition, sorting and induction through the analysis of the test evaluation, and give comments and guidance timely. Through these methods, the interactive teaching process is more effective, which not only controls the classroom teaching process, but also improves the ability of students to obtain information.

5.2   Interaction in the Process of Class Discussion

In the process of classroom teaching, research and discussion is really important for students to construct a system of knowledge by themselves. Through data sorting and data analysis on their own, communicative discussion with classmates and interactive communication with teachers, a relatively complete knowledge cognition is gradually formed. In the smart classroom teaching environment, students use information technology to obtain plenty of learning resources and dynamic information, carry out interactive communication and collaborative exploration on a certain issue, and share learning

results. Meanwhile, teachers provide guidance and help for students' learning based on information technology platform, and promote students' construction of knowledge.

In the process of research and discussion, students upload and post what they do not understand on the class discussion board through the mobile or other terminal, and display them on the whiteboard or large screen in the classroom, which is easy for students to discuss. In the process of discussion, if you don't understand something, the teacher can guide the students or operate the demonstration by himself, search the relevant content online, the computer screen can be projected on the curtain, and the students can see the whole process of searching and exploring. On the one hand, the advantages of this approach are that the classroom discussion atmosphere is active, and everyone participates in the discussion, which avoids students just looking down at their mobile terminals for "silent" communication or doing other things. On the other hand, teachers can understand the whole process of research and discussion, know the situation of each student, can adjust the teaching method and process at any time, and find the teaching methods suitable for students.

5.3   Interaction in the Process of Classroom Tests

In the smart classroom teaching environment, the interaction in the in-class assessment process is mainly reflected in the process of teachers pushing test questions intelligently through the information technology platform, and students completing test questions and submitting answers through the information technology terminals. The test and evaluation information system of the platform will automatically give the test and evaluation results of objective questions, and give immediate feedback to students and teachers for improving teaching.

Specifically, the information technology platform uses intelligent terminals and cloud-based information system for test and evaluation to conduct real-time processing and real-time feedback of students' homework tests, and timely statistical analysis of all students' scores and evaluation results. Teachers can understand students' mastery of knowledge through result analysis, and immediately analyze the wrong causes and give correct answers. In-class assessment and interaction can be carried out either in the teaching process or after the completion of teaching tasks to test students' grasp of a certain knowledge or the whole content taught in the class, so as to facilitate teachers to grasp students' learning situation and make targeted teaching plan and supplementary explanations.

6   Summary and Prospect

Under the guidance of the concept of smart education, smart classroom takes learners as the center, integrates information technology with in-class & after-class teaching, achieve the sharing of teaching resources, creates intelligent teaching environment with the help of big data technology to innovate teaching methods, and promotes students' thinking ability. The innovation of this research has the following three points: the innovation of teaching model, Structural changes in the teaching system and the informalization of curriculum teaching. The construction of smart classroom teaching model can push

forward the process of smart education, and it is also the starting point and final destination of the realization of the value of educational informalization. The research on the construction of smart teaching model is still in the exploratory stage, and it should accept further testing and perfected by further practice: How to construct the smart teaching model based on information technology and big data, establish the concept of "smart teaching" and "smart learning", optimize the teaching content and methods under the smart classroom environment, and form a smart teaching system with the characteristics of college English; How to deeply explore into the learning behavior, learning process and learning evaluation data, develop individualized teaching plans and strategies to adapt to the differences of students, and truly achieve individualized teaching; How to conduct scientific and objective evaluation of learners' emotions and attitudes in the learning process, so as to transform from cognitive evaluation to emotional evaluation to conduct comprehensive evaluation. Further research is needed to improve the new teaching model.

References

1. Liu Bangqi. Smart Classroom [M]. Peking: Beijing Normal University Press, 2006.
2. He Kekang. Theories and Methods of in-depth Integration of Information Technologies and Courses [J]. Chinese University Education, 2005 (5): 43-48.
3. Wu Xiaoru, Liu Bangqi, Yuan Tingting.A New Generation of Smart Class: Concept, Platform and System Architecture [J]. China audio-visual Education, 2019 (3): 81-88.
4. He KeKang. New Development of Educational Technology Theory from Blended Learning [J]. Audio-visual Education Research, 2004 (3).
5. Yuan Mengxia. Research on Smart Classroom Teaching Strategies based on Network Learning Space [J]. Information Technology, 2017 (1): 178
6. Li Jianjuan. Construction of College English Wisdom Classroom in the era of "Internet+" [J]. Journal of Mudanjiang College of Education, 2018 (6): 53-55.
7. Jiang Jiabo. Intelligent Education and Intelligent Campus [J]. Chinese Educational Informalization 2013(20): 13.
8. Wu Yongjun. [J]. Rethinking the Smart Classroom. New classroom Research · Basic Education, 2008 (4): 5-7.