Big Data-Driven Personalized Teaching of College English

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Abstract: With the wide application of cloud computing and big data technology, the ubiquitous personalized teaching environment is rapidly forming and the personalized teaching mode is gradually becoming the trend of contemporary education. However, college English teaching in China has limited relevance and low effectiveness in personalized teaching, which cannot fully meet the needs of "learner-centered" teaching and tailor teaching to students' needs. Therefore, this study aims to explore personalized teaching of college English based on the characteristics of college English teaching in China andcollege English learners' online learning behaviors. A conceptual framework of personalized teaching is established based on accurate understanding of college English learners. This conceptual framework can provide possibilities for teachers to make personalized instructional design of college English teaching.

1. Introduction

With the rapid evolution of information technology, the pace of education informatization has accelerated significantly, effectively promoting the continuous innovation of educational philosophy. Currently, artificial intelligence, cloud computing, and big data technologies have been widely used in China's higher education, and a ubiquitous personalized teaching environment is rapidly taking shape. More and more attention has been paid to the cultivation of personalized and diversified talents, and personalized teaching mode has gradually become the trend of contemporary education.

As an essential means of cultivating international talents in China, college English teaching faces not only great opportunities, thanks to the era of globalization and informatization, but also big challenges as it is unable to satisfy the needs of socio-economic development. The usual codes, norms, and conventions, which foreign language educators depended on to support learners in becoming successful users of the language after leaving the classroom, has been disrupted[1].

Effective pedagogy enhanced by technology can adaptively modify teaching strategies in real-time, utilizing smart technology to monitor learners' differences and changes in individual characteristics, performance, and personal development[2]. However, in practice, one-size-fits-all

teaching strategy is widely adopted for different learners concerning curriculum, teaching methods, teaching devices, and teaching process. The needs and interests of the learners are usually overlooked, which may lead to disengagement, lack of motivation, and limited learning outcomes[3]. Learners' personalized development has not been effectively considered and personalized teaching has not been prioritized.

With the help of big data technology, teachers can have a more accurate understanding of learning behaviors and grasp the learning situation from the aspects of learning characteristics, learning preferences, mastery of knowledge, etc. They can form more targeted instructional decision-making, meet the learners' needs, and enhance the instruction effectiveness. Therefore, the focus of college English teaching reform is gradually shifting towards exploring effective strategies for implementing personalized teaching by combining big data technology and the characteristics of college English teaching.How can big data technology influence college English teaching and how does it support the personalized teaching of college English?

2. Problems in College English Personalized Teaching

Personalized teaching that centers on learners and tailors teaching to students' needs can better adapt to the individual needs of learners and cultivate their independent learning ability, which can be the direction of reform in current college English teaching. College English teaching needs to pay attention to the different characteristics and personality of students, so as to develop the strengths and potentials of each student. In the smart foreign language teaching environment, there have been significant changes in teaching technology and teaching environment. However, in practice, the individual needs and personalized learning paths of college English learners have not been sufficiently supported, and personalized teaching of college English has not been fully utilized. The reform of foreign language teaching in a smart teaching environment has become a key focus in higher education reform.

2.1. Inadequate "learner-centered" personalized teaching system of college English

College English teaching is constrained with insufficient diversity of personalized teaching resources based on students' needs. Limited teaching resources cannot meet the needs of learners with different learning styles. Low learner engagement and poor learning outcomes have become a common occurrence in practice. There is also a lack of effective personalized assessment and diagnostic mechanisms in evaluating learning effectiveness, and teachers cannot accurately know about the learning needs, learning progress, and knowledge mastery of each learner. As a result, teaching strategies cannot be adjusted to learner's individual needs in time. In addition, the level of informatization literacy among teachers varies greatly. Some teachers do not develop skills for utilizing modern teaching technology and teaching platforms required for personalized teaching, making it difficult to achieve good teaching effect.

2.2. Incomplete integration of information technology and college English teaching

The smart teaching platforms provide possibilities for the reform of college English teaching. However, in practice, smart teaching is just implemented in forms. It fails to realize the integration of information technology and personalized teaching, thus making it difficult to achieve the classroom teaching innovation. There are many instances where college English teachers blindly apply information technology in teaching without fully taking the advantages of it. They may assign learning tasks regularly but fail to trace learning behavior, leading to the lack of feedback and guidance to learners in accordance. Some teachers complain that applying smart teaching will

increase their workload. Due to the lack of mining the vast amount of performance data generated by learners on the platform, it is difficult for teachers to scientifically and accurately assess learners' current levels. Without accurate understanding of the cognitive stage and level of learners, it is difficult for teachers to provide personalized supports, which may lead to the increase of ineffective learning time and decrease teaching efficiency.

2.3. Lack of comprehensive development and utilization in college English smart learning data

The process data of college English smart teaching platforms has not been fully integrated, resulting in data silos that cannot effectively support teaching analysis. The lack of systematic design for the smart learning environments of college English, and the absence of integration and fusion among various learning systems as well, leads to the inability to utilize and share learning-related data and resources. Due to the absence of a learning analysis framework, learners and their learning activity data are not properly measured, collected, analyzed, and reported, which fails to help learners carry out goal-oriented learning. At the same time, there are various partially applied and single-functioned learning services, which work as isolated and closed platforms and makes it difficult to provide personalized support for learners. Thus, an integrated platform is needed to provide service for open, standardized, and cross-domain applicable shared resources.

3. Strategies for Personalized Instruction Practice of College English in the Era of Big Data

By mining the online learning behavior and cognitive patterns of college English learners through data logic, college English teachers can accurately analyze learners' learning styles and cognitive characteristics, summarize scientific and authentic educational and teaching rules, and form analysis framework to guide their future personalized teaching. They should further integrate college English teaching with modern information technology, obtain valuable information from the data generated in online learning environments, and combine personalized teaching of college English with online learning resources. Personalized teaching aims at the objective of automatically or semi-automatically aligning learning content with the needs and preferences of learners[4]. Through understanding and mastering the core concepts, process methods, and key technologies of data-driven personalized teaching, teachers are able to better design teaching processes, improve teaching strategies, and enhance the effectiveness of college English teaching.

3.1. Implementing personalized teaching of college English based on smart teaching platform

Most colleges and universities in China have built smart classrooms, and smart teaching based on MOOC platforms, flipped classrooms, Rain Classroom, etc. has been actively and widely applied in college English teaching. The intelligent teaching platform has provided strong environmental support for the personalized teaching of college English. These platforms contain a vast amount of digital resources, including lesson plans, original micro-teaching resources, assignments, and online tests. A space of intelligent online learning and teaching has been constructed, which deeply integrates information technology with smart testing, autonomous learning, precision teaching, and diversified evaluation.

College English teaching and learning activities in the smart platform have generated a large amount of process data in daily teaching activities, mainly including teaching data, learners' behavioral data, and result data. Through the continuous collection of teaching process and result data, the detailed information on learners' learning interests, learning participation, learning engagement, classroom interaction, knowledge intake, and even emotional state can be obtained,

gradually forming college English teaching big data. The massive Web learning resources, large-scale learning process data, and cases of smart instruction model innovation and original resource construction in the Smart Learning Platform provide strong data support for college English personalized teaching. Through big data analysis, college English learners' online learning behavior and cognitive regularity are mined, and their learning style and cognitive characteristics are accurately analyzed, finally summarizing scientific and real educational teaching regularity, and forming a logical analysis framework. Through further integrating college English educational teaching with modern informatization concepts, teachers combine personalized college English learning needs with net learning resources. Data generated in the online learning environment is valuable information and is used to design personalized college English teaching. At the same time, based on big data analysis technology, personalized resources are pushed to learners so that they can learn, autonomously, based on their needs, clarify their weaknesses and improve them in time.

3.2. Practicing personalized teaching of college English based on learners' digital portraits

Since college English learners learn in the environment consisting of computer technology, communication technology, artificial intelligence technology, network technology, and multimedia technology, etc., a large amount of learner data has been generated. Based on the learners' behavioral data in the college English smart teaching platform, data mining is oriented to their learning behavior characteristics, as the relationship between learning behavior data and cognitive abilities has been proved to be significant[5] . Online learner data can be extracted and the data processing and label analysis can be carried out, and the college English learner portrait dimensions based on online learning behaviors can be determined. Learner portrait research is carried out by extracting and screening the indicator features in each dimension, and the portrait output through the modeling of learning behavior and data analysis.

Dynamic portrait data can be used to understand learners' explicit and implicit behaviors. Therefore, teachers can identify the pain points of college English teaching and master learners' characteristics. The concept of big data and personalized education is used as a guideline to carry out the college English instruction design[6]. According to learner portrait diagnosis and learning behavior assessment, teachers can propose personalized support services and recommend more suitable personalized learning paths to students[7]. Teachers can further improve their teaching strategies, implement tailor-made teaching, and explore innovative paths of college English personalized teaching.The framework proposed for big data-driven personalized teaching of college English is shown in figure 1:
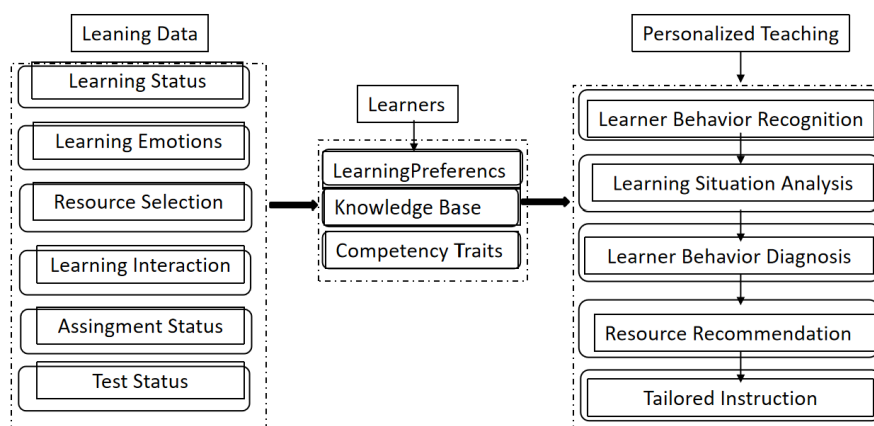

Figure 1: Framework of big data-driven personalized teaching of college English

3.3. Providing college English personalized teaching support based on big data

On the basis of identifying college English online learning behavior, predictive analysis is carried out on learners' learning status, learning emotions, and learning results, accurately describing the learner's learning preferences, knowledge reserves, ability deficiencies, and other individual characteristics. A timely feedback mechanism can be established, allowing teachers to communicate one-on-one with students through online platforms to understand their learning difficulties and needs, and provide targeted support. Therefore, relevant recommendation of learners' personalized learning paths and corresponding suggestions of learning strategies are formulated for each college English learner, focusing on the learner's own characteristics, personality differences, and different learning styles. At the same time, the teaching content and resources suitable for learners' needs and actual learning level, as well as personalized learning activities and task arrangements, are accurately recommended to provide targeted and precise learning support for college English learners. Teachers can also use big data analysis technology to realize intelligent learning feedback and support. According to learners' real-time learning data, personalized feedback is provided and learning progress reports are regularly generated. Learners are guided to adjust their learning methods and strategies and helped to comprehensively understand their own learning effects. In this way, teachers can promote student-centered, inquiry-based, and autonomous learning by designing diverse teaching activities, thereby cultivating students' critical thinking skills, practical abilities, and cross-cultural communication skills[8].

4. Conclusions

Personalized teaching acknowledges the existence of individual differences, calls for attention to the individual, and advocates for tailored instruction. For a long peirod, college English teaching is almost entirely one-sided, standardized, and mass-oriented. One single teacher faces hundreds or even more students at once, and learning performances are evaluated in an in bulk way. In this context, individuals are overlooked and submerged. Utilizing modern educational technologies, including networks and platforms, to design and implement research and practices in personalized teaching should be a highly significant initiative. New types of teaching pattern has been formed in the era of big data, and data-driven personalized instruction decision-making is an effective way to improve the quality of college English teaching. Therefore, college teachers should consciously collect, organize, analyze, express, and communicate data and accurately formulate personalized teaching strategies according to the results of big data analysis, so as to meet the learners' diverse learning needs. In addition, college English teachers should also pay attention to improving their own informatization literacy, use information technology and big data analysis technology to effectively integrate teaching resources, and then cultivate more competitive and adaptable English talents.

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