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English Learning Model Innovation and Technical Support Based on Big Data Analysis

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ABSTRACT
With the rapid development of information technology, big data analysis is increasingly widely used in education, which profoundly impacts language learning methods. As a widely used skill training activity, the implementation and effect evaluation of college English teaching faces new opportunities. Multi-channel data acquisition makes the teaching process more intuitive, learner behavior records create conditions for personalized program design, and the adaptive system supported by technology improves the effect of knowledge absorption. Therefore, this paper discusses the path of English learning innovation in the big data environment, aiming to find a way to combine technical means with educational goals.

KEYWORDS
Big data analysis; English learning; Model innovation

1 Introduction

Improving English learning is inseparable from the reasonable distribution of learning intensity. However, the class size limits the traditional teaching mode, and adjusting to each student's learning progress is difficult. Big Data Technology transforms students' learning behavior into measurable learning behavior records, which lays the foundation for students' continuous autonomous learning. The integration of multiple types of learning data can not only improve teaching arrangements but also it can promote the innovation of evaluation methods and promote the dynamic change of teaching strategies. Therefore, this paper will discuss the specific support of big data analysis technology in the innovation of English learning mode to construct a practical and feasible implementation scheme of smart learning.

2 The changing trend of English learning styles under the background of big data

2.1 The diversity of data sources promotes the transparency of teaching

Many data records in English teaching make the teaching process clear and visible. In traditional teaching, teachers learn about students mainly through classroom questions and examinations, which are usually not comprehensive enough. Today's systems collect various learning data: the number of online studies and the speed at which questions are answered reflect study habits, and recordings of spoken and written texts show language use problems. Some devices can also capture changes in the eyes or voice as the student reads. These different data types are brought together to make learning processes that would otherwise be difficult to observe quantifiable. The key to transparency is to establish an objective basis for evaluation. For example, the essay marking system can point out grammatical errors and analyze the distribution of error types to help teachers find specific problems that students often make. This makes teaching guidance more accurate, moving from unified teaching to specific training for individual shortcomings. However, transparency is not just a matter of piling up data. Its value is creating an effective cycle of "Collecting data——finding problems——and adjusting teaching." When the system compares students' writing materials within three years, teachers can see their progress. This long-term tracking method of teaching observation represents a transformation that is difficult to achieve in traditional classrooms.

2.2 Learning is more personalized and flexible

The new data-based English learning model has two characteristics: the learning content is more targeted, and the learning arrangement can be adjusted independently. The intelligent system records the learning behavior to build a personal ability profile, including basic elements such as vocabulary and sentence pattern mastery, to push the most needed practice content. For example, it is found that students have a limited vocabulary of modal words in their writing. In that case, the system will provide targeted exercises for different scenarios, replacing the fixed content sequence of the textbook. Changing the self-control of the learning schedule, learners can combine the content according to their actual needs, such as focusing on strengthening listening while preparing for exams and focusing on business language during daily work. The main improvement is that the system can dynamically balance individualization and systematicness. The

learning navigation function will automatically adjust the difficulty according to the operation. Suppose students repeatedly misunderstand a specific sentence pattern in the discussion. In that case, the system will add a basic explanation and provide more relevant material for the discussion topic that is often participated in. This flexibility preserves both individual characteristics and key points of knowledge. For example, office workers can take terminological shorthand at noon, simulate dialogues in practical training environments at night, and continuously optimize individual learning plans with whole-process learning data, reflecting technology's actual expansion to English learning modes and scenarios[1].

3 The construction direction of English learning model innovation

3.1 Intelligent recommendation for learning content

English teaching systems can adjust the learning content in real time according to the actual situation of students. While traditional teaching is to have all students use the same textbook, today's technology system can produce different exercises for each individual's situation. The system will constantly analyze the students' network behavior, from the accuracy of the answer, the completion time, the type of error, and so on, to find out the most need to strengthen their own. For example, when students repeatedly make collocation errors in their compositions, the system can directly skip the existing grammar items and select commonly used verb phrases as topics for special training. The three main principles of content delivery are to ensure that the training is of the right level of difficulty, to focus on the most recent study plan, and to retain some of the new subject knowledge to broaden horizons. This mechanism allocates teaching resources more reasonably and effectively. For example, in college English training, when a student is found to be making a speech at an international seminar, the focus will be on the common sentence patterns and phrases in the academic report, thus reducing the time of daily teaching. This method does not need to set parameters manually but only needs to achieve the optimal allocation of the content according to the accumulated data so that the content of the exercise can better meet the actual needs of students to improve the learning efficiency of students [2].

3.2 Real-time feedback and process management

The big data learning management system can guide the whole process of training. Unlike the past practice, the new technology implements guidance in the process of students' operation. When there is an obvious pronunciation deviation in oral practice, the system immediately displays the standard pronunciation sketch map; when the sentence structure is confused in the writing process, the system automatically provides sentence restructuring suggestions. This intervention solves the problem in the formative stage and avoids the solidification of repeated errors. The key improvement lies in the timing of feedback. In traditional teaching, teachers need to give feedback on problems after correcting homework, and now they can get corrective suggestions when errors occur. The management process not only corrects the errors but also automatically adjusts the follow-up practice arrangements according to the performance. When the system noticed that the students had difficulty understanding the specific listening content, the follow-up training would increase the proportion of similar materials; if a skill were mastered faster, an advanced task would be introduced in advance. Dynamic adjustment ensures the practice content is always maintained in the appropriate range of challenges, neither because it is too simple to stop progress nor because the challenge is too big to produce frustration. Therefore, the continuity of the training process is strengthened, and students can maintain a longer period of effective learning. This management method has been shown to reduce the time spent in ineffective practice and to make learning progress more smoothly[3].

3.3 The role of the teacher places greater emphasis on guidance and support.

After dealing with basic teaching tasks, digital technology can promote the transformation of teachers' functions into guidance and support. Teachers are no longer mainly responsible for explaining knowledge points but focus on new responsibilities: helping students to analyze learning progress charts and make improvement plans, training students to master the method of arranging learning steps, and Encouraging students to stay interested and confident. The specific work format involves teachers guiding students in interpreting the system-generated vocabulary mastery curve, focusing on the next stage of memory retention, and organizing classroom discussions to address complex problems the system cannot handle. Regular communication to understand the psychological changes in the learning process. The role change requires teachers to have new ability dimensions. For example, teachers can check the system data and find that a student's reading speed is slow and confirm that it is due to insufficient reading skills through face-to-face communication; then, the step-by-step training program is designed instead of increasing the amount of reading. Technical support enables teachers to grasp the nature of learning disabilities more accurately, focus on the irreplaceable

areas of technology, understand the individual needs of special circumstances, and deal with psychological problems related to learning methods. Overall planning of long-term training direction. In this collaborative model, technology is responsible for standardizing the training process, and the teacher can focus on the student's development needs [4].

4 The practical support path of big data technology

4.1 The technical basis of data collection and collation

Learning trajectories can be tracked using big data. Every learning action students complete on the platform is saved in real-time, including the answers to selected exercises, the time node for submitting assignments, the specific location for revising essays, looking up words and expressions in the electronic dictionary, and replaying audio and video clip intervals. These basic records form a continuous learning file, allowing the teacher to review the learning progress at any time. The system employs a universal storage structure to preserve information, ensuring data from different periods can be coherently compared. It also conducts a preliminary classification of the original records: grouping listening errors into categories that can be intervened in teaching, such as "inappropriate speech rate," background noise interference," and "vocabulary blind spots"; marking writing issues as training directions like "logical coherence," "use of examples," and "grammatical norms." This type of basic processing transforms unordered data into units of information that can be taught and understood. The core value of learning records is to establish teaching relevance. When students listen to a certain English dialogue repeatedly, the system synchronizes the speed of the paragraph, the density of new words, and the position of the topic. When continuously revising the same paragraph in an essay, record the syntactic complexity of that paragraph and the teacher's evaluation level. By establishing logical connections between different learning actions, a meaningful observational perspective for teaching is formed, accurately identifying learning disabilities characterized by specific subjects and providing solid evidence for intervention measures[5].

4.2 Analysis tools assist in teaching decision-making.

Learning data is transformed into actionable teaching guidelines, with the system automatically converting raw records into clear charts: progress curves display the trends in knowledge mastery within the class, classification tables compare the error characteristics of different student groups, and colored blocks distinguish the levels of weakness in knowledge points. Teachers quickly locate the teaching focus through these intuitive views. For example, they find that the error rate of "Application of attributive clause" is significantly higher than that of "Understanding of noun clause" in the knowledge points of the clause, so they strengthen the relevant training. In addition, decision support runs through the whole process of teaching. In the lesson preparation stage, the system pushes the collective weakness report from the previous study (such as "Half of the students confuse the present perfect tense with the past tense"). After correcting the homework, generate a high-frequency error distribution map (such as "Preposition collocation errors are concentrated in the at/on usage scenario"). At the end of the phase test, list specific ability shortcomings (such as "The accuracy of inference questions is 15 percentage points lower than that of detail questions"). Concise teaching suggestions accompany all the analysis results. Teachers can freely choose the scheme based on the teaching arrangement, and the system always maintains the auxiliary positioning, thus greatly improving the timeliness of teaching adjustment. An efficient closed-loop system of "Problem identification——plan making——implementation verification" is established.

4.3 Continuous improvement of the learning platform

Learning tools are constantly improving to keep the teaching fit. The functional upgrade is based on multi-party empirical feedback: the frequency of statistical modules is used to determine the common functions, and the effectiveness of the functions is tested by comparing the old and new versions of academic data (such as the improvement of the accuracy rate of related questions after the addition of the word association module), teachers' written improvement proposals are collected regularly. Before each major update, the teaching verification test is carried out to ensure that the technical update serves the core objectives of teaching. For example, the essay review function is online after 10 classes and three rounds of trial, according to the quality of grading data optimization score dimension settings. The optimization process pays attention to the value of teaching ontology. For example, The initial version of the platform used a simple timing method, which led to students idly accumulating study hours. Teachers adjusted to the double recording rule of"Effective task completion + quality standard" after reflecting. The current system can implement a bimonthly evaluation mechanism: reviewing the teaching value of functions with less than a 30% utilization rate, strengthening and expanding empirical and effective functions, and prioritizing content development with a strong demand for education reform. This dynamic evolution ensures that the platform absorbs technological progress and always bases itself on the law of teaching so that digital tools can become a supportive force rather than a dominant

factor in educational development.

5 Conclusion

This paper reveals how the Digital Learning Platform fully records the learning process, provides suggestions for teaching improvement, and constantly optimizes its functions. The design of the function should be closely related to the actual needs of classroom teaching, and the renewal of the platform needs to be tested in teaching practice. Therefore, schools could set up dedicated groups or mechanisms to collect and analyze learning information to give teachers a clear understanding of the learning situation in the classroom. Teachers should take into account the learning weaknesses and suggestions for improvement provided by the platform as an important reference for daily lesson planning and teaching, and focusing on student-focused errors, platform developers need to work closely with schools to regularly check whether the functionality of the platform meets teaching objectives, and adjust and improve it according to the actual use of teachers and students. The ultimate goal is to make the data collected by the learning platform can be effectively transformed into effective teaching methods and improve students' classroom teaching quality and learning efficiency.

About the Author

Derong Tang, a master in reading, lecturer, research direction: English.

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