

Exploring Personalized Learning Paths for Online English Education in the Context of Big Data

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Abstract: Currently, the integration of digital technology and education continues to deepen, and big data technology provides core support for the innovation of online English education. Personalized learning is a key direction to meet the differentiated needs of learners and improve the quality of education, and it is also the core driving force for the sustainable development of online English education. The aim of this study is to explore personalized learning paths for online English education under the background of big data, and to assist learners in achieving efficient English proficiency improvement and personalized growth. At the same time, corresponding optimization strategies are proposed to address the problems of insufficient utilization of learning data, insufficient precision of personalized services, and lack of systematic learning planning in current online English education. This study is of great significance in promoting the high-quality development of online English education. It can not only enhance learners' English learning effectiveness and self-learning ability, but also lay a solid foundation for the innovation and upgrading of the online education industry and the construction of a lifelong learning system.

Keywords: Big data; Online English education; Personalized learning; Learning path; Educational Innovation

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Introduction

Against the backdrop of rapid development in the digital economy, online English education has become an important component of the education field due to its flexibility, convenience, and other advantages. With the increasing demand of learners for personalized and precise education, the traditional one size fits all online English teaching model is gradually unable to meet diverse needs. Big data technology can comprehensively collect and analyze multidimensional data such as learners' learning behavior, ability level, interest preferences, etc., providing technical possibilities for the implementation of personalized learning. How to use big data technology to build a scientific and efficient personalized learning path, break through the development bottleneck of online English education, has become a core issue of concern in the current industry. As the foundation of a lifelong learning system, education's personalized transformation not only concerns the individual development of learners, but also has a profound impact on the sustainable development of the online education industry^[1].

1. Basic Theory of Big Data and Personalized Learning in Online English Education

1.1 The connotation and value of big data application in the field of education

The core of the application of big data in the field of education is to collect various behavioral data of learners during the learning process through advanced data collection technology, including learning duration, mastery of knowledge points, accuracy of answering questions, learning pace, etc. By using data analysis algorithms to deeply mine these data, it is possible to accurately understand the learning characteristics and potential needs of learners. Big data technology has brought revolutionary changes to online English education, breaking the fuzzy judgment of learners' cognition in traditional teaching and achieving quantitative analysis and dynamic tracking of the learning process. Its value lies not only in enhancing the scientificity of teaching decisions, but also in providing tailored learning support for each learner, promoting the transformation of education from batch supply to precise services, and providing core technical support for the construction of personalized learning paths^[2].

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1.2 Goals and Challenges of Personalized Learning in Online English Education

The core goal of personalized learning is to respect individual differences of learners, develop exclusive learning plans based on factors such as their English foundation, learning ability, learning goals, interests, etc., in order to improve learning efficiency, enhance learning motivation, and help learners achieve targeted improvement in comprehensive abilities such as English listening, speaking, reading, and writing. The personalized development of online English education not only needs to meet the needs of learners of different age groups and learning stages, but also adapt to diverse learning scenarios in the context of lifelong learning.

However, the implementation of personalized learning is not always smooth sailing. In current online English education, some platforms lack the ability to deeply process learning data and only stay at the level of data collection, making it difficult to transform into effective teaching decisions; Different learners have significant differences in their English foundations, and their demand for personalized services is diversified, which increases the difficulty of precise service matching; In addition, learners' learning interests are variable and their self-directed learning abilities are uneven, which also poses challenges for the continuous promotion of personalized learning paths. At the same time, data security and privacy protection issues are becoming increasingly prominent, becoming important factors restricting the deep application of big data in personalized education.

In this context, big data technology is seen as a key tool for solving personalized learning challenges. It can achieve comprehensive analysis and accurate interpretation of learning data, providing scientific basis for the formulation and adjustment of personalized learning plans. How to fully leverage the technological advantages of big data and address the multiple challenges faced by personalized learning still requires continuous exploration and practice. Only by effectively solving these problems can we promote the comprehensive improvement of personalized level in online English education and provide learners with a better learning experience.

1.3 The Relationship between Big Data and Personalized Learning in Online English Education

Big data and personalized learning in online English education have a high degree of synergy. Big data technology is the core support for achieving personalized learning, and personalized learning is an important landing scenario for the application of big data in the field of education. Big data can provide comprehensive data support for the construction of personalized learning paths, by accurately profiling learners' English abilities, identifying their knowledge weaknesses and areas for improvement, thereby achieving personalized adaptation of learning content, learning pace, and teaching methods^[3].

In online English education, big data technology can dynamically adjust the push strategy of learning resources and optimize the learning path based on the real-time learning situation of learners. For example, for learners with weak English foundations, priority should be given to pushing basic vocabulary and grammar courses; Personalized training focused on business English communication skills for professionals in the workplace. This collaborative relationship can not only improve the accuracy and effectiveness of online English education, but also promote the cultivation of learners' self-learning ability, drive the transformation of online English education from teaching centered to learning centered, and provide strong support for the construction of a lifelong learning system.

2.Strategies for Building Personalized Learning Paths in Online English Education under the Background of Big Data

2.1 Construction of Accurate Learner Profile

Building a precise learner profile is the foundation and prerequisite for personalized learning paths. Online English education platforms should establish a comprehensive data collection system to comprehensively collect learners' static and dynamic data. Static data includes learners' age, gender, English proficiency level, learning objectives, etc; Dynamic data covers behavioral data during the learning process, such as course selection preferences, distribution of learning duration, progress in mastering knowledge points, types of answer errors, interactive participation, etc.

By using big data analysis techniques to integrate and analyze this data, a multidimensional learner profile can be constructed. On the one hand, accurately positioning learners' English proficiency level, clarifying their strengths and weaknesses in vocabulary, grammar, listening, speaking, and other aspects; On the other hand, mining learners' learning behavior characteristics, such as learning habits, learning styles, and interest preferences. Based on accurate profiling, educational platforms can clearly grasp the personalized needs of each learner, providing scientific basis for the customization of subsequent learning paths. At the same time, it is necessary to establish a dynamic data update mechanism to continuously optimize the profile based on the learning progress of learners, ensuring the timeliness and accuracy of personalized services^[4].

2.2 Intelligent push of personalized learning content and resources

Based on accurate learner profiles and utilizing big data algorithms to intelligently push learning content and resources, it is the core link of personalized learning paths. Online English education platforms should build a rich and diverse library of learning resources, covering English learning content of different difficulty levels, subject types, and skill dimensions, such as vocabulary courses, grammar lectures, listening training, oral conversations, reading materials, writing guidance, etc.

By analyzing data, identify the weak points of learners' knowledge. For example, if the data shows that learners have a high error rate in tense related exercises in the past, priority will be given to pushing specialized courses and targeted exercises related to tense; Based on learners' learning goals and interests, push suitable learning content, such as providing IELTS and TOEFL related preparation resources for learners planning to study abroad, and offering English film and television dialogue recitation courses for learners who enjoy watching movies and TV shows. At the same time, adjust the frequency and difficulty gradient of content push based on the learners' learning pace to avoid a decrease in learning motivation caused by learning content that is too difficult or too easy. In addition, learners should be supported to choose their own learning content, achieving an organic combination of algorithm recommendation and autonomous selection, fully respecting learners' subjective will.

2.3 Real time optimization and adjustment of dynamic learning paths

Personalized learning paths are not fixed, but require dynamic optimization based on learners' learning progress and data feedback, which is the key to ensuring learning effectiveness. Online English education platforms should establish real-time monitoring mechanisms and track learners' learning outcomes through big data technology, including knowledge mastery rate, skill improvement rate, and achievement of learning goals.

When the data shows that learners have mastered a certain part of the content proficiently, automatically adjust the learning path and move on to the next stage of learning content; If it is found that learners repeatedly make mistakes or have weak grasp on a certain knowledge point, relevant specialized training should be added in a timely manner, and the learning pace should be adjusted to ensure that learners have a solid grasp of the knowledge point before continuing to move forward. At the same time, optimizing the learning path based on the changes in learners' learning behavior, for example, if learners have shortened their recent learning time, they can appropriately split the learning content and push fragmented micro courses; If the learner's interactive participation is low, interactive learning tasks with strong interest can be added. In addition, a learner feedback mechanism should be established to encourage learners to provide feedback on learning content, push methods, etc., combining subjective feedback with objective data to further enhance the personalized adaptation of the learning path.

2.4 Personalized supply of multi-dimensional learning support services

The construction of personalized learning paths requires not only customization of learning content and paths, but also supporting personalized learning support services. Based on big data analysis, provide learners with multi-dimensional and precise support. In terms of learning guidance, suitable tutors are matched based on the learning characteristics of learners. For example, teachers who are good at oral teaching are matched for learners with weak oral skills, and more learning supervision and guidance are provided for learners with weak self-learning

abilities.

In terms of Q&A services, by analyzing learners' common questions and error types, an intelligent Q&A library is established to achieve instant answers to common questions; For complex problems, quickly match professional teachers for targeted coaching. In terms of learning evaluation, we abandon the traditional single exam evaluation model and build a multi-dimensional process evaluation system based on big data. We comprehensively evaluate learners from multiple aspects such as learning attitude, learning progress, mastery of knowledge points, and skill improvement, providing personalized evaluation reports and improvement suggestions to help learners clearly understand their learning status and improvement direction.

3.Challenges and Solutions in Implementing Personalized Learning Paths

3.1 Dual challenges of data utilization and data security

In current online English education, insufficient data utilization and data security risks coexist, becoming important obstacles to the implementation of personalized learning paths. Although some platforms have accumulated a large amount of learning data, they lack advanced data analysis techniques and professional talents, which makes it difficult to fully explore the value of data and provide effective support for personalized services; At the same time, learners' personal information and learning data involve privacy. If the platform's data security measures are not in place, it can easily lead to data leakage risks and affect learners' trust.

To address these challenges, on the one hand, the platform should increase investment in technology research and development, introduce advanced data analysis algorithms and tools, cultivate a professional team of data analysts, enhance data mining and interpretation capabilities, and transform data resources into the core driving force of personalized teaching; On the other hand, it is necessary to establish a sound data security management system, adopt encrypted storage, access control and other technical means, and strengthen the protection of learners' private data. At the same time, clarify the norms for data use, follow the principles of legality, legitimacy, and necessity, inform learners of the purpose and scope of data collection and use, and safeguard learners' right to know and choose.

3.2 Insufficient precision of personalized services

The personalized services of some online English education platforms are still at the surface level, with insufficient accuracy. The main manifestation is that the judgment of learners' needs is not accurate enough, and the matching degree between the pushed learning content and learners' actual needs and ability levels is not high; Personalized learning programs lack flexibility and are difficult to adapt to the dynamic changing needs of learners. The root of this problem lies in the insufficient depth of analysis of learning data, which fails to fully explore the potential correlations behind the data and the true needs of learners.

To improve the accuracy of personalized services, the platform should optimize the data analysis model, comprehensively consider the multidimensional data of learners, not only focus on learning behavior data, but also comprehensively analyze factors such as learning goals, interests, and cognitive characteristics; Strengthen algorithm iteration and upgrading, optimize recommendation algorithms and learning path planning algorithms through continuous user feedback and data accumulation, and improve service adaptability; Establish a personalized service evaluation mechanism, regularly collect feedback from learners on learning content and path planning, combine learning effectiveness data to quantitatively evaluate service accuracy, and promptly identify and correct problems.

3.3 Response to the lack of systematic learning planning

In current online English education, some learners have blind learning and lack systematic learning planning, resulting in low learning efficiency and unclear learning goals. This issue is related not only to the learners' self-directed learning ability, but also to the lack of effective learning planning and guidance mechanisms on the platform. Many platforms only focus on pushing a single knowledge point, failing to build a complete knowledge

system and long-term learning plan for learners, making it difficult to support their continuous growth.

To address this issue, platforms should leverage big data technology to develop systematic personalized learning plans for learners. Based on the learner's English foundation and learning objectives, decompose long-term goals into phased small goals, and clarify the learning focus and time nodes of each stage; Build a structured knowledge system to ensure the coherence and logic of learning content, and help learners gradually improve their English proficiency; At the same time, providing learners with learning progress visualization tools allows them to clearly understand their progress in the overall learning plan, enhancing their planning and autonomy in learning. In addition, the platform can set up learning planning guidance courses or equip professional learning consultants to provide personalized planning advice and adjustment support for learners.

4.Conclusion

This study explores the important supporting role of big data technology in personalized learning in online English education, and points out that using big data to construct personalized learning paths is the core direction to promote the high-quality development of online English education. It helps to meet the differentiated needs of learners, improve learning outcomes and autonomous learning abilities. A series of strategies have been proposed to address the problems in data utilization, service accuracy, and learning planning in current online English education, including building accurate learner profiles, intelligently pushing learning resources, dynamically optimizing learning paths, and providing personalized support services. This study not only provides practical reference for the innovation and upgrading of online English education platforms, but also lays the foundation for the personalized growth of learners and the construction of a lifelong learning system, which has profound significance for the digital transformation of the education industry.

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