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Research Article

Students' Ubiquitous Learning Model and Resource Sharing of English Education Based on Cloud Computing

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Human knowledge learning is a natural acquisition process of contextualization and dynamic adaptation, and classroom teaching is neither the only nor the best way to learn. The current rapid development of "cloud" resource technology and the concept of ubiquitous learning, which is characterized by personalization anytime and anywhere, has challenged the absolute teaching function of teachers and the neat and uniform teaching methods of textbooks and classrooms. Ubiquitous learning is a historical return to human learning, and teachers need to transform their roles in this change, to improve their adaptability and to become the organic driving force to realize the contemporary information aggregation structure. Based on this understanding, this paper begins with an analysis of the intelligent form of current "cloud" resources and explores the conceptual understanding and transformation pathways of the ecological context of ubiquitous learning and the corresponding role of teachers. In this paper, we design a system consisting of a teacher, a student, and an administrator, which can publish English test papers, create and manage a personal library of test papers, monitor students' practice status, and review students' performance. Storage management can be automated and intelligent, and all storage resources are integrated together, and customers see a single storage space. It improves storage efficiency, solves the waste of storage space through virtualization technology, can automatically redistribute data, and improves the utilization of storage space, while having load balancing and fault redundancy functions. Cloud storage can achieve scale effect and elastic expansion, reduce operating costs, and avoid wasting resources. Through the cloud platform, teachers can answer questions and assign homework for students online.

1. Introduction

The ecological situation of "ubiquitous learning" refers to the personalized learning situation with the above ecological characteristics, which is formed by the characteristics of "cloud" learning resources and the concept of ubiquitous learning [1]. Different from artificial "contexts," such as the Internet, desktop computers, and classroom multimedia, the personalized ecological learning context in today's ubiquitous computing era is a ubiquitous network where two or more participants are in the "cloud" and "ubiquitous network" and collaborative learning scenarios with the help of intelligent learning resources [2]. It makes learning returns from a fixed, unified curriculum and mandatory classroom teaching to differentiated and individualized learning, where students with different abilities, acquisition levels, and different development positions can learn anytime, anywhere according to their expected knowledge structure needs, to achieve personalized goals of learning and life [3]. In order to suit this learning state, the ecological background of ubiquitous learning first requires the ecologicalization of the curriculum system, that is, to set up a dynamic and open ubiquitous curriculum arrangement according to the principles of ecology, so that various knowledge elements are interdependent and interact to form a flexible and coordinated dynamic balanced body of knowledge, applicable to any environment [4, 5]. At present, computing technology has entered the "ubiquitous computing era" after the personal computer, forming a "ubiquitous network." These technical concepts have penetrated into the teaching field, and academia has put forward the concept of ubiquitous learning on this basis [6]. Therefore, this paper not only conducts in-depth research on the mode construction of English ubiquitous learning from the perspective of system

functional linguistics but also conducts corresponding research on the application of cloud computing resources to support English ubiquitous learning, so as to make the research more close to the application [7].

The study believes that in the actual communication process, the speaker uses language to convey meaning, not only using specific words but also through the use of tone, expression, gestures, and other modeled language systems to reveal or supplement the real meaning of the words in front of them, so as to complete the accurate expression of the full meaning, even more so in the language of joking and ridicule [8]. Language learning is not a process of knowledge transfer but a systematic process of knowledge meaning construction; secondly, "meaning construction is always based on a specific context" [9]. Therefore, it is imperative to create a ubiquitous learning situation for English learning. The most important thing to realize ubiquitous learning is to build a ubiquitous learning platform and environment, which not only includes exogenous factors but also endogenous factors. Only by using today's highly developed computer digital technology, integrating relevant cloud resources, and constructing an English learning model with simultaneous multisensory interaction and meaning transfer can such a learning situation with multiple symbolic resources be created [10]. Its research will provide a new research perspective for English teaching in my country to meet the challenges of the times and innovate the context-aware ecological learning system of Chinese English [11].

2. Related Work

The domestic academic community, on the other hand, has made corresponding researches on the learning methods [12], teaching resources construction [13], and technical support [14] of ubiquitous learning, and especially, the environment construction of ubiquitous learning has become a hot spot of current research [15]. However, there are relative limitations in these preliminary researches, firstly, more researches only focus on the discussion in the field of technology but less explore the combination of knowledge engineering and applied linguistics theory; secondly, there are more general theories about distance education and learning society, but fewer research results involve teaching reform and teacher role transformation. Currently, [16–18] and [19] argue that pervasive computing technologies can simulate real-life scenarios to immerse learners and reconstruct information in complex environments. [20] investigated the complementarity of different symbols in multimodal discourse and the synergy of multimodality in foreign language classroom teaching.

3. Functional Module Design of English Practice System

The design of the system mainly consists of three subsystems: teacher side, student side, and administrator side, and the teacher side and student side are the core components of the system.

3.1. Teacher Side Function Module Design. The system is mainly designed with the teacher as the leading role. The teacher side has a wide variety of functions, including publishing English test papers, establishing and managing personal test paper libraries, monitoring students' practice status, and reviewing students' results. Through this platform, teachers can answer questions and assign homework for students online. The specific functions of the teacher module are shown in Figure 1.

Teachers can select test papers through the system and publish them to students for their practice. There are several modes for teachers to create test papers: Firstly, they can choose practice questions that already exist in the system's question bank, such as the past year's English aptitude test questions. Secondly, teachers can create their own test papers according to different types of questions, such as multiple choice, reading comprehension, and translation. Third, the papers are formed according to the weaknesses of students' daily learning knowledge, such as filling in the blanks with the correct form of the given words for systematic practice. Fourthly, questions are drawn from the personalized question bank and the papers are assembled. After the papers are created, they are posted as homework for students to take practice tests.

In the self-built question bank module, teachers can create their own personalized English practice question banks and upload and change the created question banks. The questions in the library can be varied and can come from the English textbook or the teacher's own test questions used in class preparation. The system can only give scores and has no diagnostic function after students practice with the self-built questions. In this module, teachers can choose to set "private or shared" for the uploaded questions and can share resources between schools when conditions allow.

The grade view module allows teachers to check students' English practice, grasp students' learning status, and understand students' online study time, test submission, submission time, and test completion rate through the teacher side. Through this module, teachers can check students' English scores and grasp the practice status of the whole class through the statistical analysis table, including ranking, average score, highest score, lowest score, and number of test papers completed. The teacher can check and analyze the test papers to know the score rate and error-prone question numbers of each question type, and the teacher can focus on answering and reviewing students' wrong questions, so that students can get the teacher's comments on the student side.

The message board set up in the Q&A module is mainly for teachers to provide homework assignments. Students can ask questions to the teacher through the message board, and the teacher can keep interaction with the students through the message board. In order to avoid students wasting unnecessary time, the system is designed without adding a network social platform.

3.2. Student Function Module Design. Students can complete the exercises assigned by the teacher, view the study details and grades, read the teacher's comments, and organize the wrong questions. Through this module, students can view the contents of the message board and communicate with

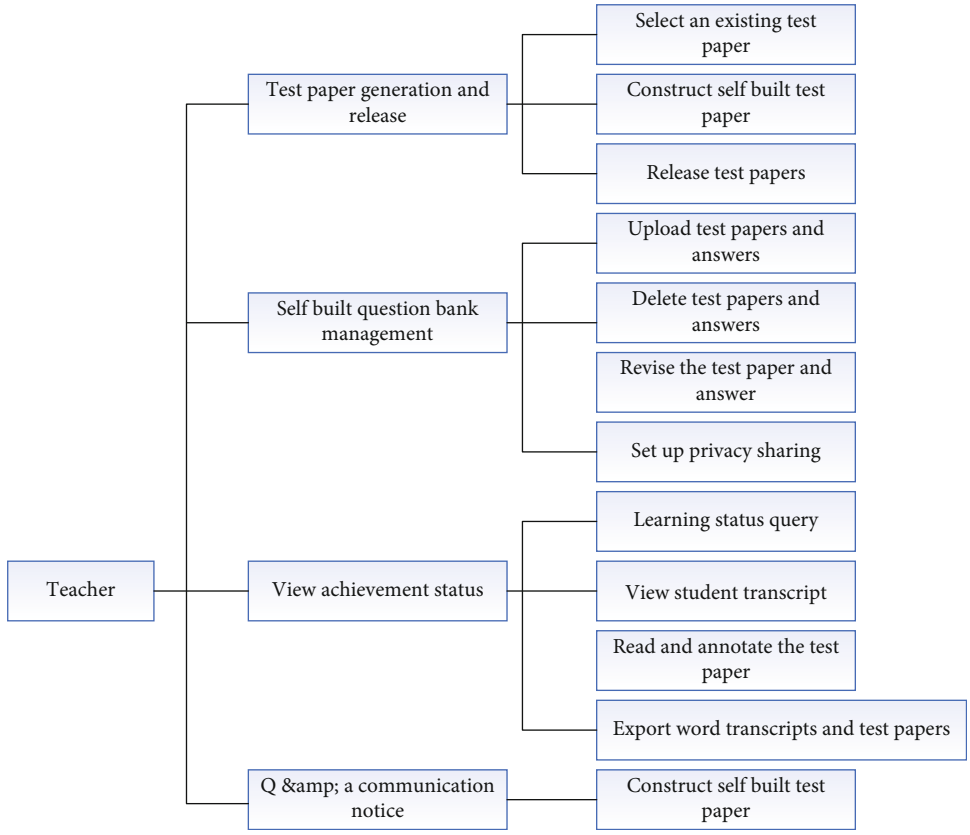

Figure 1: Teacher-side function management module.

the teacher in a timely manner. The module allows students to view the contents of the message board and communicate with the teacher in a timely manner. The specific function module is shown in Figure 2.

The online practice module can be used for students who have limited time and energy to study, so students just need to complete the exercises assigned by the teacher on time. In order for students to simulate the real English test environment, it is important to ensure the quality of practice. If for some reason students need to stop practicing during the English test, they can simply save it. Incomplete test questions are not counted in the overall grade. Once students have completed the exercises and submitted them, a pop-up window will appear on the student's end for a summary of the exercises they have worked on.

Students can check their recent learning status through the result query module, and they can also check the results of other students, and through the information statistics table, each knowledge point and weakness of the question type will be arranged from high to low, showing the percentage of achievement. The student module allows students to analyze the error points of the exercises and consolidate their knowledge.

Through the module of collecting mistakes, students can check the mistakes in the past exercises and mark them for processing, and each mistake has its corresponding source and practice time. In addition, each question is followed by a "targeted practice" button, which allows students to practice systematically based on that question type.

3.3. Administrator Function Module. The main functions of the administrator side of this module are as follows: teacher and student management, class creation, teacher and student information registry, and account assignment. The specific module is shown in Figure 3.

The administrator can manage the class teachers and students through the teacher and student management module, set up the grade class examinations, and add, change, and delete personal information and other operations.

The administrator can update the personalized question bank through the test paper management function module and remind teachers to upload questions to meet the specifications if necessary. The administrator can make changes to the text or serial number errors of the exercises in the system question bank as reflected by teachers and students, understand the teachers' management of the test papers, and provide guidance to the teachers for wrong operations.

When the system breaks down or teachers have problems in the operation process, the administrator has to deal with the information in time according to the feedback from students or teachers.

4. English Practice System Application and Implementation

The English practice system can realize student information management, English test question bank management, test management, and online communication, etc.

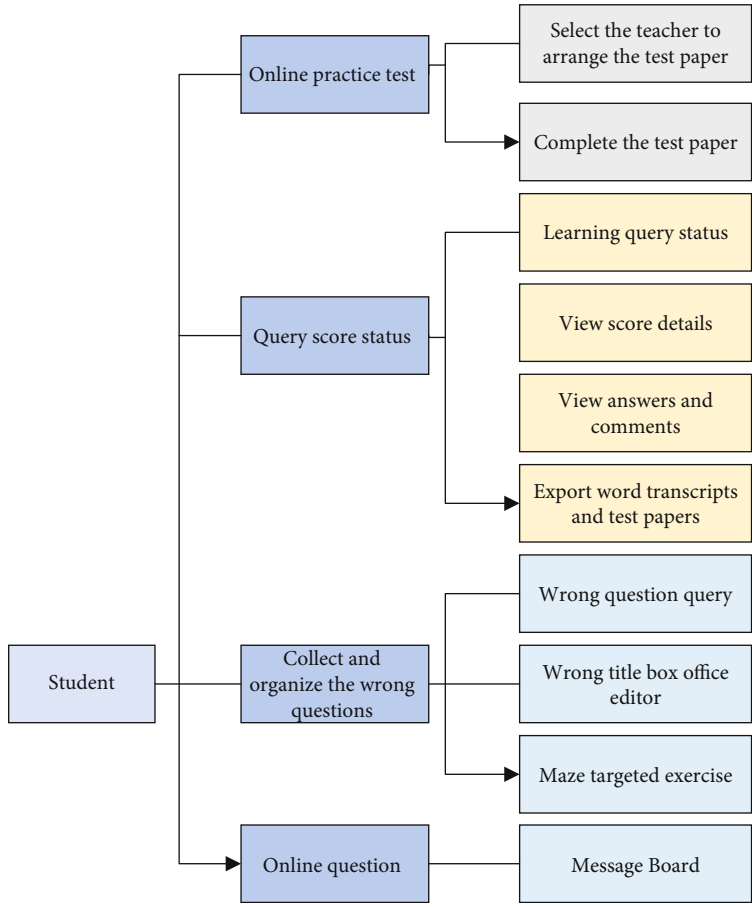

Figure 2: Student side function management module.

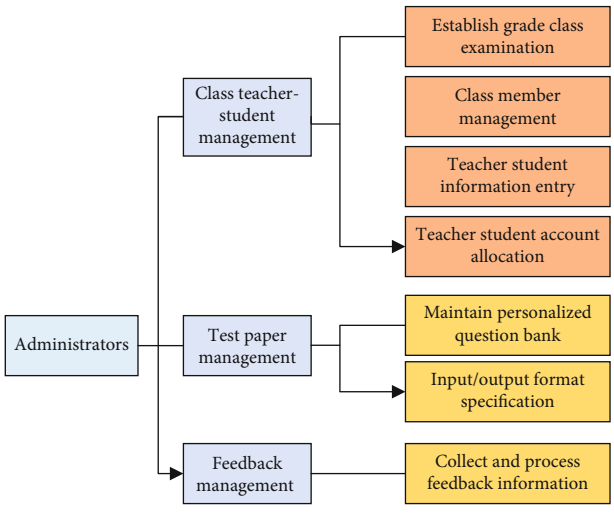

Figure 3: Administrator side function management module.

4.1. Student's Basic Information Management. The basic information of students includes student number, name, ID number, mobile phone number, class, major, etc. The system will verify the entered identity and give corresponding prompt if it does not match. In order to avoid the phenomenon of same name and surname, the combination of school number and name should be applied so that the same name can be distinguished, which is very important in the management of student information.

4.2. English Practice Question Bank. The English practice question bank contains chapters, question stems, answers, and scores. Since the practice system is a suggested practice system, it requires different questions with different stems, and all of them are in classroom mode, and all of them can be edited.

4.3. English Practice System. The design of English practice system is the core part, which can monitor students' practice in real time and can realize students' information management, online learning function, and online communication with teachers, so as to truly achieve information-based teaching.

5. English Practice System Operation Process

The main flow of the system learning is shown in Figure 4.

The learner logs in, confirms his/her identity, and then follows the specific steps to remind him/her to operate. The system generates strategies based on the learners' choice of question types, difficulty level settings, and number of questions. The system queries the student's learning records based on database information, generates reminders of weak points, and sets the difficulty of the English test paper based

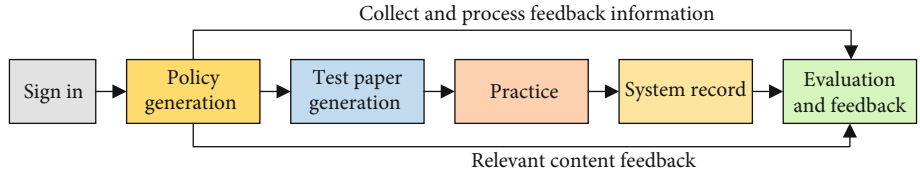

Figure 4: Flow chart of English practice system operation.

on the learner's suggestions. In test paper generation, the system generates English test papers according to the conditions set by the students. Students practice, and on the basis of the generated English test papers, learners practice in stages. The system keeps a record of the student's practice, so that the student can practice on the wrong questions. In evaluation and feedback, the system can evaluate and give feedback to the students' practice, and the students' right and wrong answers will be given feedback when the strategy is generated [21–23].

6. Example Analysis

A college English teaching classroom wants to transport a batch of goods from English teaching vocabulary O to English teaching vocabulary E. Via A, B, C, and D four English teaching vocabulary and the adjacent two English teaching vocabulary between the transport options given in Table 1, its relevant parameters are given in Table 1 and Table 2, and each English teaching vocabulary cargo demand is shown in Table 3 with unit handling cost of 1 yuan and unit handling time of 6 min. In the volume of change, how to choose english teaching path [24–26], In the case of changing transport volume, how to choose the english teaching route, so that the university classroom can save the total transport cost and shorten the total transport time.

The English teaching algorithm developed by MATLAB is used to solve the problem. The English teaching size is 50, the pheromone importance is 1, the heuristic factor importance is 0.2, the pheromone evaporation is 0.1, and the maximum number of iterations is 1 000. The total transportation cost is 3,482 yuan, the total transportation time is 84 h, and the objective function change curve is shown in Figure 5.

From the experimental results of the calculations, it can be seen that transportation cost and transportation time are originally two contradictory objectives, and how to make the two balanced depends on the enterprise's decision. The solution in this paper is to seek to minimise the transport time of the enterprise under the objective of minimising the cost of the enterprise. Alternatively, one can set objective one as, f_1 objective two as f_2, and convert multiple objectives $F = f_1 * f_2$ into a single objective to solve for [19].

As shown in Figure 6, after the clustering of different English teaching knowledge points, in this process, the teacher should analyze the problems encountered in detail, so as to truly realize the purpose of "internalising the knowledge in the heart and externalising it in action," thus improving the effectiveness of teaching .

Table 1: Unit freight rates and transport schedules between the various English teaching terms.

	O-A	A-B	B-C	C-D	D-E
Railway	50/5	70/9	50/14	112/20	120/28
Highway	35/4	75/11	95/18	90/15	110/20
Aviation	80/1	100/2	120/3	130/4	154/4
Water transport	45/6	60/12	M/M	75/16	100/30

Table 2: Unit transit costs and transit schedules between different modes of transport.

	Railway	Highway	Aviation	Water transport
Railway	0/0	2/2	2/2	2/2
Highway	2/2	0/0	1/1	2/2
Aviation	2/2	/1/	0/0	1/1
Water transport	2/2	2/2	1/1	0/0

Table 3: Table of demand for goods for each civic glossary.

O	A	B	C	D	E0
0	5	7	0	0	8

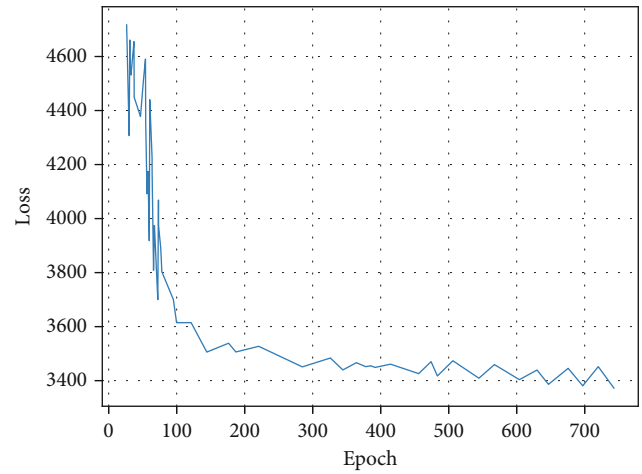

Figure 5: Evolutionary curve of the English teaching algorithm.

The characteristics and laws of the curriculum of higher education English teaching course determine that offline ideological and political education is necessary and important. As shown in Figure 7, it can be known that the ideology class in colleges and universities has a strong ideological nature and students themselves are less receptive to more

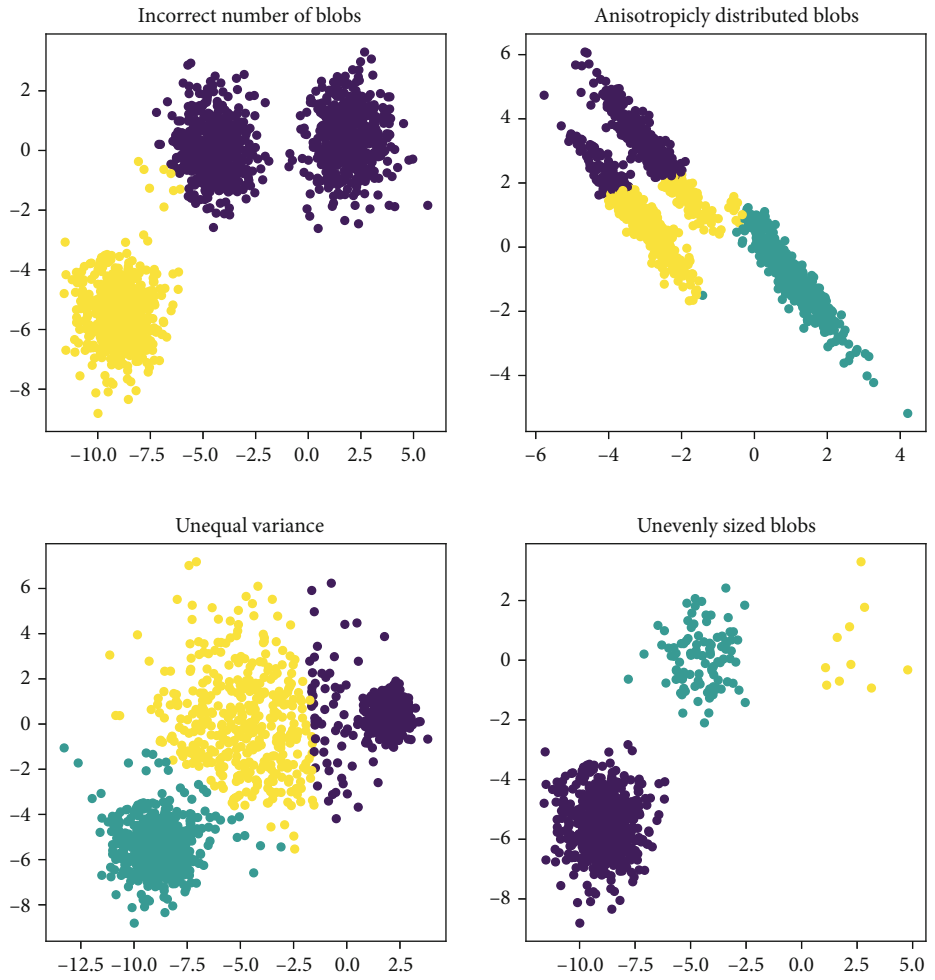

Figure 6: Clustering of different English teaching knowledge points.

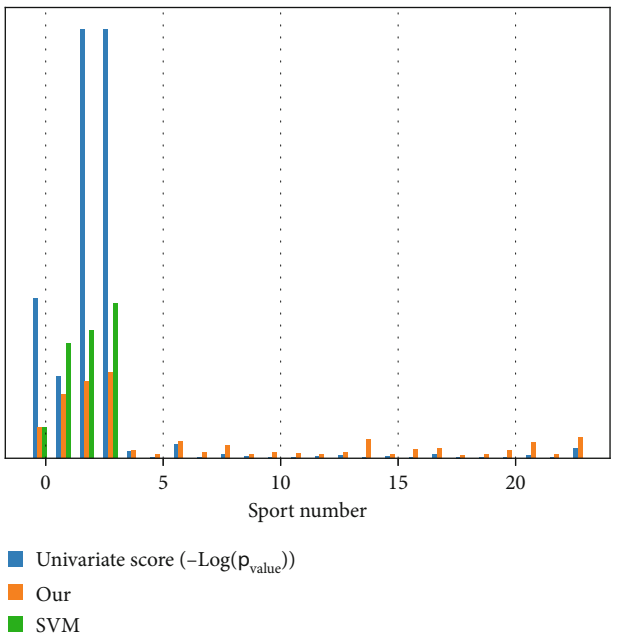

Figure 7: Different Bayesian estimates.

theoretical knowledge, so the transmission of much theoretical knowledge must be done with repeated explanations and careful guidance from teachers. When teaching, the teacher chooses the appropriate method of delivery according to the real needs of the recipient. For example, situational teaching methods and discussion methods can be used to communicate with students emotionally, so that students can consciously generate enthusiasm for learning the subject and help them deepen their understanding of it; teachers must learn to use the thinking of the Internet to carry out online ideological and political education.

7. Conclusions

With the continuous development of information technology, informationisation in education has become an unstoppable trend. In this paper, we propose a comprehensive weight determination method combining subjective and objective, with subjective assignment and then self-learning combined with Bayesian networks and great entropy criterion. By grasping the characteristics of information technology and the nature of the curriculum of the university's English teaching course, the in-depth integration of the two is promoted.

Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declared that they have no conflicts of interest regarding this work.

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References

[1] S. A. Aljawarneh, "Reviewing and exploring innovative ubiquitous learning tools in higher education," *Journal of Computing in Higher Education*, vol. 32, no. 1, pp. 57–73, 2020.

[2] W. Wei, "A new" offline+ online" teaching model of college English based on cloud computing," in *Forest Chemicals Review*, Elsiever, 2021.

[3] M. A. Virtanen, E. Haavisto, E. Liikanen, and M. Kääriäinen, "Ubiquitous learning environments in higher education: a scoping literature review," *Education and Information Technologies*, vol. 23, no. 2, pp. 985–998, 2018.

[4] L. A. Cárdenas-Robledo and A. Peña-Ayala, "Ubiquitous learning: a systematic review," *Telematics and Informatics*, vol. 35, no. 5, pp. 1097–1132, 2018.

[5] X. Wang, W. Zhang, and X. Yang, "Construction of course ubiquitous learning based on network," *EURASIA Journal of Mathematics, Science and Technology Education*, vol. 13, no. 7, pp. 3315–3323, 2017.

[6] M. Despotović-Zrakić, K. Simić, A. Labus, A. Milić, and B. Jovanić, "Scaffolding environment for adaptive e-learning through cloud computing," *Journal of Educational Technology & Society*, vol. 16, no. 3, pp. 301–314, 2013.

[7] H. Y. Wang, G. Z. Liu, and G. J. Hwang, "Integrating socio-cultural contexts and location-based systems for ubiquitous language learning in museums: a state of the art review of 2009–2014," *British Journal of Educational Technology*, vol. 48, no. 2, pp. 653–671, 2017.

[8] L. Xiao-Dong and C. Hong-Hui, "Research on VR-supported flipped classroom based on blended learning — a case study in "learning English through news"," *International Journal of Information and Education Technology*, vol. 10, no. 2, pp. 104–109, 2020.

[9] S. Kanagarajan and S. Ramakrishnan, "Ubiquitous and ambient intelligence assisted learning environment infrastructures development-a review," *Education and Information Technologies*, vol. 23, no. 1, pp. 569–598, 2018.

[10] B. Ji, Y. Li, D. Cao, C. Li, S. Mumtaz, and D. Wang, "Secrecy performance analysis of UAV assisted relay transmission for cognitive network with energy harvesting," *In IEEE Transactions on Vehicular Technology*, vol. 69, no. 7, pp. 7404–7415, 2020.

[11] X. Lin, J. Wu, S. Mumtaz, S. Garg, J. Li, and M. Guizani, "Blockchain-based on-demand computing resource trading in IoV-assisted smart city," *In IEEE Transactions on Emerging Topics in Computing*, vol. 9, no. 3, pp. 1373–1385, 2021.

[12] X. T. Kong, G. W. Chen, G. Q. Huang, and H. Luo, "Ubiquitous auction learning system with TELD (teaching by examples and learning by doing) approach: a quasi-experimental study," *Computers & Education*, vol. 111, pp. 144–157, 2017.

[13] G. Yang, "application of cloud teaching in higher vocational english teaching—take the MosoInk Cloud Class as an example," in *In IOP Conference Series: Materials Science and Engineering*, p. 12211, Shenyang, China, 2020.

[14] Z. Zheng-Wan, W. Di, and Z. Chun-Jiong, "Study of cellular traffic prediction based on multi-channel sparse LSTM," *Computer Science*, vol. 48, no. 6, pp. 296–300, 2021.

[15] J. A. González-Martínez, M. L. Bote-Lorenzo, E. Gómez-Sánchez, and R. Cano-Parra, "Cloud computing and education: a state-of-the-art survey," *Computers & Education*, vol. 80, pp. 132–151, 2015.

[16] M. Rath, "A methodical analysis of application of emerging ubiquitous computing technology with fog computing and IoT in diversified fields and challenges of cloud computing," *International Journal of Information Communication Technologies and Human Development (IJICTHD)*, vol. 10, no. 2, pp. 15–27, 2018.

[17] F. Giannakas, G. Kambourakis, A. Papasalouros, and S. Gritzalis, "A critical review of 13 years of mobile game-based learning," *Educational Technology Research and Development*, vol. 66, no. 2, pp. 341–384, 2018.

[18] H. S. Gill, O. I. Khalaf, Y. Alotaibi, S. Alghamdi, and F. Alassery, "Multi-model CNN-RNN-LSTM based fruit recognition and classification," *Intelligent Automation & Soft Computing*, vol. 33, no. 1, pp. 637–650, 2022.

[19] S. Rajendran, O. I. Khalaf, Y. Alotaibi, and S. Alghamdi, "MapReduce-based big data classification model using feature subset selection and hyperparameter tuned deep belief network," *Scientific Reports*, vol. 11, no. 1, p. 24138, 2021.

[20] O. I. Khalaf and G. M. Abdulsahib, "Design and performance analysis of wireless IPv6 for data exchange," *Journal of Information Science and Engineering*, vol. 37, pp. 1335–1340, 2021.

[21] S. Cui, "Research on across-cultural communication in college English teaching based on cloud platform," *Journal of Computational and Theoretical Nanoscience*, vol. 14, no. 1, pp. 89–93, 2017.

[22] M. Sarrab, N. Alalwan, O. Alfarraj, and A. Alzahrani, "An empirical study on cloud computing requirements for better mobile learning services," *International Journal of Mobile Learning and Organisation*, vol. 9, no. 1, pp. 1–20, 2015.

[23] T. S. Hew and S. L. S. A. Kadir, "Understanding cloud-based VLE from the SDT and CET perspectives: development and validation of a measurement instrument," *Computers & Education*, vol. 101, pp. 132–149, 2016.

[24] Y. A. Qasem, R. Abdullah, Y. Y. Jusoh, R. Atan, and S. Asadi, "Cloud computing adoption in higher education institutions: a systematic review," *IEEE Access*, vol. 7, pp. 63722–63744, 2019.

[25] I. Arpaci, "Antecedents and consequences of cloud computing adoption in education to achieve knowledge management," *Computers in Human Behavior*, vol. 70, pp. 382–390, 2017.

[26] S. Kim, S. M. Song, and Y. I. Yoon, "Smart learning services based on smart cloud computing," *Sensors*, vol. 11, no. 8, pp. 7835–7850, 2011.