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Research Article

English Teaching Innovation and Cooperation Platform Assisted by Mobile Computing

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Aiming at the problems existing in English teaching, based on mobile computing technology, this paper establishes energy consumption optimization model, delay optimization model, and user mobility model and discusses the design and application of English innovation and cooperation platform in detail. Then, it analyzes the application of the three models in English teaching in primary schools, middle schools, and universities. The results show that the innovative cooperation platform of English teaching based on mobile computing can greatly improve the efficiency of English teaching, reduce the burden of teachers, and increase the English learning enthusiasm of students in different grades. In general, this paper provides some experimental support for the design and application of mobile computing in English teaching innovation platform.

1. Introduction

Now, mobile computing has become an important data resource affecting the people's daily life. All walks of life have realized that whoever can make better use of mobile computing resources can better base and develop in this industry. In the education industry, mobile computing also has its important position [1, 2]. Due to the massive data resources of mobile computing, better use of big data in mobile computing can enable education industries to obtain more educational resources, update educational ideas and methods, and provide an important guiding role for better teaching activities [3].

Due to the continuous popularization and development of computer and Internet, a variety of data are constantly produced in people's daily work and life. When these data accumulate to a certain extent, the big data era in mobile computing is formed. As the name suggests, the big data of mobile computing refers to the huge scale and quantity of information data, and its scale can no longer be captured and used by the common software used in daily life and work. Big data of mobile computing has four characteristics: massive, dynamic, diverse, and valuable [4, 5]. In the education industry, the existence of mobile computing brings not only rich teaching resources to educators and students but also advanced teaching methods and teaching ideas. Through the development of various Internet platforms, such as flipped classroom, Mu class and micro class, it has also become a new teaching method in the Internet era and played a corresponding role [6].

The research on information technology-assisted instruction in China started relatively late [7]. Until the end of last century, information technology really began to be applied to English teaching and achieved remarkable results. At this stage, many schools have established multimedia classrooms, and projectors and digital teaching equipment have been widely used. In the multimedia teaching environment, students can obtain English learning materials more conveniently. For example, they can obtain realistic images and listen to vivid voice. In this way, they can learn foreign languages more intuitively [8]. After entering the new century, after nearly 20 years of development, information technology has been widely used in English teaching and has entered the stage of prosperity and development,

showing a variety of teaching forms. At the same time, in this stage, the teaching resources are more targeted, which not only carry out the teaching design from the perspective of teachers but also fully take into account the different learning styles of students. Teaching products are gradually improved, and theory and practice are effectively combined to jointly promote the development of teaching quality [9]. For example, students can carry out self-study activities with the help of multimedia CDs. Teachers can get convenience from electronic teaching plans in teaching. The campus network has developed rapidly and been fully applied to practical teaching activities, which has achieved remarkable results and far-reaching impact.

In recent years, with the improvement of mobile computer processing speed, the expansion of memory capacity, the enhancement of reliability, the durability of battery power supply, the improvement of wireless network speed, the expansion of bandwidth, the improvement of reliability and security, and the diversification of mobile application software have been improved [10]. What is more, mobile computing provides great potential for the improvement of English teaching information management and the enhancement of information processing ability, which can make the realization of "Digital Classroom" possible. However, mobile computing technology itself is still in the development stage and is still far from the mature stage of technology. In order for teachers and students of English teaching to understand and accept this technology, we must first introduce the concept of mobile computing and the application of mobile computing technology in the field of English teaching and then analyze the actual situation in the teaching classroom in detail [11]. In addition, the information management task of mobile computing system, the information needs of users, the functions of mobile computing information system, and mobile computing technology have been well improved. Finally, a management framework of English teaching innovation platform based on mobile computing technology is given to help relevant personnel choose information management strategy and design mobile information management system.

The concept of mobile computing has three important components [12–14]: mobile computer, wireless network, and mobile application software. Mobile computer refers to the computer that users can use indoors or outdoors and on the move, including tablet PC, palmtop, personal digital assistant (PDA), and wearable PC, but does not include the commonly referred to laptop. Wireless network refers to all types of computer networks except wired network and can provide access support for mobile devices. The types of wireless networks include wireless wide area network (WWAN), wireless local area network (WLAN), wireless personal area network (WLAN), and satellite communication. Mobile application software refers to computer application software that supports mobile computers and wireless networks and can support the working process of users. Generally, mobile application software should consider the environment around users and make timely response and appropriate adjustment to users' mobile computers and wireless networks.

Now, as the mobile computing develops, more and more experts at home and abroad apply mobile computing to English teaching innovation platform. Chen [15] combines mobile computing with English teaching, which has produced unexpected results. Aiming at the shortcomings of current English teaching innovation, Zhang et al. [16] use mobile computing for integration, break the traditional English teaching mode, and create a new and flexible English teaching platform. Wang et al. [17] apply big data analysis in mobile computing to college English teaching, so that teachers and students on campus can enjoy the convenience brought by mobile data to English teaching. Xie [18] studies mobile computing platforms, such as SMS sending platform and GPRS platform, and applies them to English teaching, so as to provide students with information on learning, scientific research, and life services. Liang [19] studies the work of mobile computing data transmission, takes into account the relevant contents in English teaching, introduces the sleep scheduling mechanism, and further improves the construction and design of English teaching innovation platform by mining more teaching innovation characteristics.

According to the problems existing in English teaching, this paper uses mobile computing for construction optimization and establishes energy consumption optimization model, delay optimization model, and user mobility model in English teaching. Then, the model of mobile computing is applied to the innovation platform of English teaching, and the impact of this model on English teaching in junior middle school, senior high school, and college is studied. In general, this paper provides some theoretical support for the design and application of mobile computing in English teaching innovation platform.

2. Establishment of Mobile Computing Model

Through the analysis of collaborative work theory, the collaborative work platform based on mobile computing should include vertical and horizontal integration. Vertical integration includes the integration of the whole life cycle workflow of English teaching by the collaborative platform, while horizontal integration refers to the integration of different types of information technology by the collaborative platform [20]. Therefore, the theoretical framework of teaching innovation platform based on mobile computing consists of vertical and horizontal integration.

Mobile computing-based English teaching innovation platform is a teaching information database based on a three-dimensional model, which is very suitable for the collaborative work mode of English teaching, so as to make the real collaborative work possible. Through the English teaching collaborative innovation platform, teachers and students can obtain English teaching information very accurately, enhance their understanding of English teaching requirements, and review, modify, apply, and analyze the English teaching innovation platform according to students' own characteristics and needs. This innovative platform can determine the key and difficult points in the initial stage of English teaching, so as to clarify the possible problems in the teaching process. In addition, through the innovative English teaching platform of mobile computing, the virtual 3D English teaching model can be used to simulate the

progress of English teaching and students' learning. At the same time, due to the application of mobile computing technology in this collaborative platform, English majors of different grades are also included in this platform, so that English majors can learn better.

At present, there is a lot of work in the field of mobile edge computing. Most of the task migration problems involved focus on the migration decision-making on the user side. In these works, we will first estimate an expected delay or energy cost for the target task. According to the estimated data, if the task migration can help reduce the waiting delay of task results or reduce the energy consumption overhead, it can be migrated to the mobile edge network for processing. According to the different optimization objectives of these works, they are divided into two types in this section: the model for task energy consumption optimization and the model for delay optimization [21, 22]. Therefore, this section will also introduce the user mobility model into the task migration of mobile edge computing.

2.1. Energy Consumption Optimization Model. At present, there has been a lot of work to support the energy consumption optimization of mobile edge computing.

The related work and model are relatively mature in energy consumption optimization, which is worth asking for task delay optimization in the follow-up. It is an important theoretical basis and reference model for modeling.

Energy consumption optimization model is a computing migration framework for multiple devices under mobile edge computing, and the optimization model is planned as an optimization problem model for the purpose of minimizing equipment energy consumption. Based on this energy consumption optimization goal [23], a three-stage migration scheme is realized by (1) classifying mobile devices, (2) making decisions on priorities, and (3) allocating resources.

In general, the model has three ways: locally executing the task. By statistics in the overhead and delaying the overhead through different ways, combined with the minimum delay limit of user tasks, the task migration of mobile edge computing is scheduled and allocated.

According to the data recorded by the sensor at that time, to perceive the correlation between its behavior or environmental factors and the application or service being used by the user at that time, it is necessary to establish a mobile computing model, which is as follows:

$$T_i = [d_i, c_i, t_i^{\max}], \quad i \in N, \tag{1}$$

where d_i is the size of the input data; c_i is the computing power required to complete the task, that is, the number of CPU cycles required; and $t_i^{\max}$ is the minimum delay limit of the migration task.

Meanwhile, energy consumption cost mainly refers to the energy consumption change caused by various data changes based on mobile computing. Generally, the energy consumption overhead in mobile computing can be defined by the following parameters:

$$e_i^L = c_i \varepsilon_i^L, \tag{2}$$

where ε_i^L represents the energy consumption of a local CPU cycle of device i.

If the traffic volume of transmitted data is considered $\varphi_p(t)$ and transmission energy P, the formula of the energy consumption optimization model is as follows:

$$D_c = 1.64 \times 10^{-6} \bullet \varphi_p(t)^{1.8} \bullet (1-p)^{2.2}. \tag{3}$$

To ensure the accuracy of calculation and avoid wasting energy resources, the following calculation formula is adopted:

$$F_3(T) = 0.02K - 4.86, \tag{4}$$

$$F_4(H) = \left[\frac{(1-p)}{(1-p_0)}\right]^{2.2}, \tag{5}$$

where K represents the energy consumption rate, p is the transmission energy of t time, H means the number of energy collected, and p_0 is the initial transmission capacity.

This optimization problem has been proved to be a problem about mobile computing. Therefore, a task migration scheme (EECO) which can obtain suboptimal solution is proposed. The scheme consists of three stages [24]: classify mobile devices, priority decision, and wireless resource allocation. When assigning priority to the third type of equipment, under the condition of ensuring that the delay can be met, if the greater the energy saving gain that can be obtained after task migration, the higher the priority will be. The priority value of each task will be calculated and compared with the calculation results.

2.2. Delay Optimization Model. The above model focuses on the energy consumption. Under the condition of meeting the user's minimum delay requirements for tasks, it may be difficult to meet the user's Internet application experience under the background of providing more and more convenient energy and becoming more and more sensitive to processing delay.

The delay optimization model is to migrate the user's computing intensive tasks to the station, which can reduce the execution delay (D_0). When the user's local device executes all computing tasks by itself (i.e., does not perform task migration), its execution delay represents the time spent executing tasks locally at the user's device. If the computing intensive tasks are migrated to the mobile edge computing small base station for processing, the execution delay is adopted, which includes the following three parts: (1) the transmission duration (D_{ot}) of transmitting the migrated data to the mobile edge computing node, (2) the calculation and processing time (D_{op}) of the migration task by the small base station in the mobile edge computing system, and (3) the reception time (D_{or}) spent by the user equipment receiving the processing result data transmitted back from the small base station after the migration task is processed.

$$D_{\text{ot}} = \sqrt{2 \times D_0^2}, \tag{6}$$

$$D_{\text{op}} = 2.35 \times 10^{-6} \bullet \exp\left(\frac{-2119}{D_0}\right), \tag{7}$$

$$D_{\text{or}} = 3.54 \times 10^{-7} \bullet \exp\left(\frac{2044}{D_0}\right). \tag{8}$$

In the initial state, the boundary conditions can be determined as follows:

$$D_0 = 6.4216 \times 10^{-4}. \tag{9}$$

2.3. User Mobility Model. In most application scenarios of mobile edge computing, user mobility is actually an inherent feature in such scenarios. For example, augmented reality applications or virtual reality applications are used to assist service providers in airports or museums to bring users a better service experience. In these emerging applications or services, users' mobility and movement trajectory will be able to provide users' location information and their personal behavior preference information for small base stations in mobile edge computing. This information will help improve the efficiency of processing users' computing task migration requests in the mobile edge computing system. However, we also need to analyze and recognize some challenges posed by user mobility for the realization of ubiquitous reliable computing (such as computing without interruption and error).

Considering the mobility model, most of the existing early studies regard users as static individuals. In order to make the research work closer to the actual situation, the user mobility model can be modeled by internal contact rate and interdomain contact rate to reflect the mobility of users. By predicting the user trajectory information, the user mobility trajectory can be accurately reflected by predicting the small base stations passing through the mobile user path in most indoor scenes served by mobile edge computing.

When users conduct mobile computing modeling, they can conduct modeling analysis according to the following models:

$$\frac{\partial C}{\partial t} = C_0 \frac{\partial^2 C}{\partial x^2} + C_0 \frac{\partial^2 C}{\partial y^2}, \tag{10}$$

where c is the initial population and C_0 is the trajectory distribution of mobile users.

In addition, in order to better characterize the transfer probability of users, a distance model based on the distance between users and transmission points is proposed, as follows:

$$P_i = \frac{2}{N} - \frac{d_i}{d_1 + d_2 + \cdots + d_N}, \tag{11}$$

where P_i is the mobile usage rate, which represents the usage frequency of mobile computing among users; N represents the total number of mobile computing users; and d_i represents the distance between the mobile computing and the user.

In general, in order to reflect some specific behaviors and tendencies of users, three models based on mobile computing are compared and analyzed to indicate the characteristics of users. According to such characteristics, we can preclassify the migration tasks required by user-preferred applications or services, in order to help small base stations prepare in advance, so as to further reduce the processing delay of migration tasks and improve the quality of mobile computing services.

3. Results and Discussion

3.1. Design of English Teaching Innovation Platform for Mobile Computing. The design requirements of mobile computing English teaching innovation platform are mainly reflected in the following aspects: first, practicability. The development of English teaching innovation platform, as the name suggests, is to take teaching as the core and students' learning as the foundation. The practicability of the platform should be highlighted. The concrete manifestation of this practicality is the focus content that needs to be paid attention to in the design of teaching platform, so as to find the research direction and lay the foundation for the effectiveness of teaching. Second is effectiveness. The development of English teaching innovation platform should take effectiveness as the premise, that is, the effectiveness of teaching content and teaching function. The content that the platform can provide needs to be highly consistent with the overall framework of English teaching, so as to provide guarantee for the effectiveness of teaching. Third is the richness of resources. As a basic teaching platform, the development of English teaching innovation platform should maintain the realization of the goal of resource richness, show the effectiveness of teaching in this way, and give full play to the value of resources to the greatest extent. The determination of these design requirements will lay the foundation for the display of design functions.

The English teaching innovation platform of mobile computing can be logically divided into five levels: data source, data collection, modeling cleaning, data warehouse, and application service, as shown in Figure 1. Data source is the foundation of mobile computing English teaching innovation platform, data collection is the premise, modeling cleaning and data warehouse are the soul, and application service is its specific implementation process. Data sources are various business management systems in the campus network, gathered in the data center. After being obtained by special data acquisition software, they are modeled by using data modeling tools; stored in the data warehouse through unified API (application program interface) and JDBC interface, including structured data, semistructured data, and unstructured data; and output to the application layer. Teachers, students, and managers can enter their own workflow through the graphical interface to provide information statistics and analysis, early warning and trend prediction, employment guidance, intelligent learning, and other services.

The innovative English teaching platform classroom for mobile computing is a typical smart learning environment

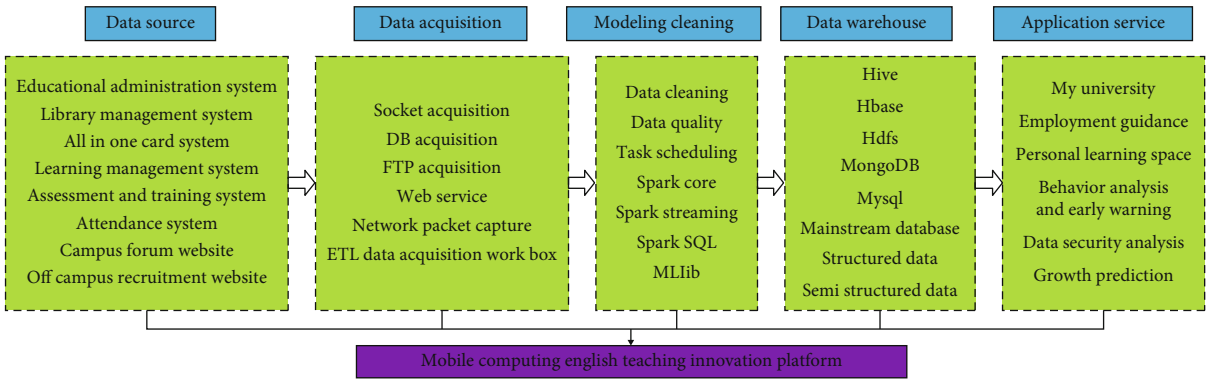

Figure 1: Logical structure of mobile computing English teaching innovation platform.

deployed under the big data smart vocational education platform, as shown in Figure 2. It is the internal appeal of the school's informatization development to a certain stage and an important place for smart learning. It adopts cloud data center architecture and server-side virtualization, while the client adopts the form of virtual desktop to allocate an exclusive personal desktop for each teacher to realize the mobile teaching of teachers.

The English teaching platform classroom is divided into two parts as a whole (Figure 3): one is the control of teaching equipment. It mainly manages and controls the teaching equipment and facilities of multimedia classroom, including projector, projection screen, power amplifier, and speaker, which are realized through intelligent power management unit and intelligent management host. The second is environmental perception control. Through various sensing devices, fans, lights, infrared, etc., the information collected by environmental perception is transmitted to the intelligent vocational education platform for processing through the campus network, including wired network, wireless network, and Internet of Things, and the results are returned. Third is the equipment control. It realizes the unified management and control of all equipment in the multimedia classroom. At the same time, it also has the functions of computer remote wake-up, automatic docking timetable, state self-examination, etc. The environmental control can realize the control of light, curtain, temperature, door lock, etc. In terms of teaching management, it integrates campus radio and voice intercom modules; integrates equipment and functions such as recording and broadcasting classroom, wireless projection, Bluetooth sound, and teaching interaction into the system platform; and provides schools with high-quality curriculum resources, video on demand, high-fidelity audio import, teaching interaction, and other functions.

Teachers can publish teaching tasks on the English teaching innovation platform of mobile computing and transmit teaching information, such as text, audio, and video, so as to provide students with rich and abundant teaching resources. Information transmission function, the basic function of mobile computing English teaching innovation platform, has built an effective communication platform between teachers and students; WeChat teaching content expansion function, with the help of WeChat teaching platform, can realize the expansion and extension of teaching content and provide students with more resource content. As for the feedback function of micro class, teaching itself is a two-way interactive process. Through feedback, students can effectively communicate with teachers and further interpret the contents they do not understand.

3.2. Key Technologies of Mobile Computing English Teaching Innovation Platform. Learning analysis technology originated in the field of commercial retail. Businesses predict customers' consumption trend through statistical analysis of consumers' purchase behavior in a certain period of time. When applied to the field of vocational education, it is to make statistics and analysis on a large number of data generated in the process of students' daily learning and life, evaluate their academic progress and interests, predict the future trend, and find potential problems. Big data comes from students' explicit or implicit learning behavior. In addition to the records of the curriculum management system and learning management system, their learning trajectory can also be found in the submission time of homework, various examinations and certifications, the registration of extracurricular activities and interest groups, and the content of forum posts. Teachers pay attention to students' social platforms. After a long period of observation, they can understand the websites and software they often use, obtain their learning rules, and accurately push relevant information and guidance.

Figure 4 vividly shows the College English teaching of different mobile computing models. The middle line represents the navigation ability of the model for mobile computing. The higher the height, the better the navigation ability. It is the model diagram of English teaching innovation platform under different mobile computing. It can be seen that the user mobility model can better reflect the design of College English teaching platform, followed by time delay optimization model and energy consumption optimization model. The above analysis results show that the interaction between teachers and students can be realized through different mobile computing models. Teaching resources exist in the cloud and ubiquitous network. Virtual communities are used for discussion and communication. Teachers

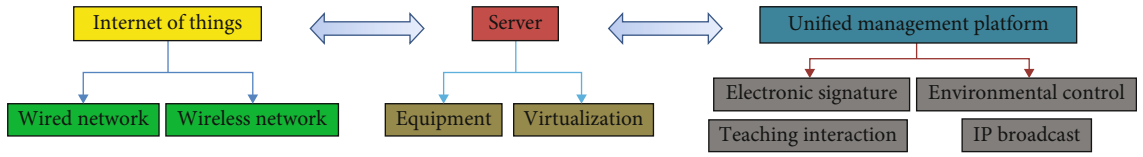

Figure 2: Composition of smart classroom.

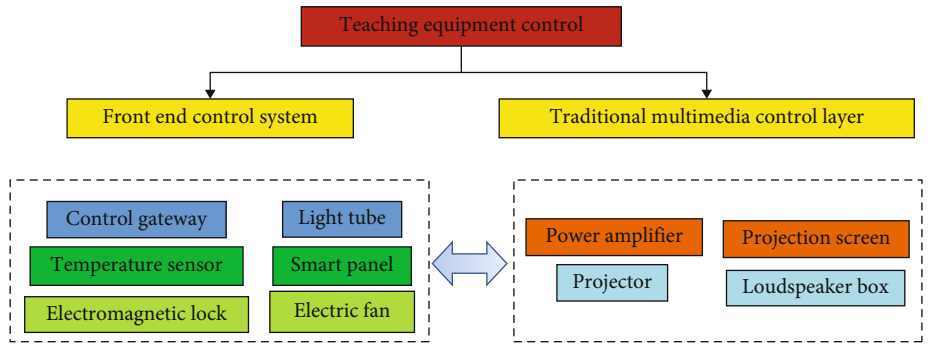

Figure 3: Construction of English teaching model based on mobile computing.

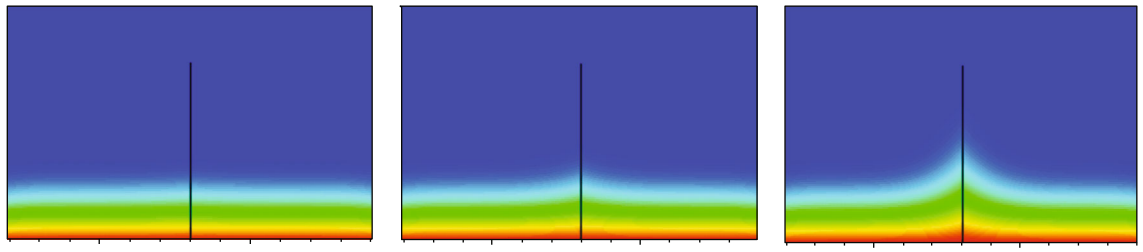

Figure 4: Model diagram of English teaching innovation platform under different mobile computing: (a) energy consumption optimization model, (b) delay optimization model, and (c) user mobility model.

undertake the design and organization of learning activities, learning guidance, and personalized evaluation. In addition, the construction of mobile computing teaching platform helps teachers arrange preview content and give reminders on the learning website according to the content of this class, refine key points and difficulties according to students' feedback, and design problem-oriented teaching courseware and resource links. In the classroom, the teacher arranges scenes corresponding to the learning content, combines lecture with practice, interleaves questions and answers, allows students to integrate into interaction, condenses the explanation time, and focuses on solving difficult problems, which can effectively improve the classroom efficiency.

3.3. Guiding Scheme Design Technology in English Teaching Innovation Platform of Mobile Computing. The application of mobile computing teaching innovation platform before college English teaching is mainly to complete the early learning situation analysis and other related work. There are individual differences among students, which is not conducive to the effectiveness of teaching. This requires a detailed analysis of the elements involved before teaching, so as to find the focus of the research and lay a solid foundation for the improvement of the quality of English teaching. For example, before class, English teachers can use the communication convenience of WeChat to transfer the teaching content to students at the first time, including teaching objectives, teaching difficulties, and discussion topics, so that students can have a preliminary understanding and understanding of the teaching content before class and learn English teaching knowledge independently at the first time. In the whole process, students are in a state of autonomy and can take the initiative to learn and obtain relevant materials. At the same time, compared with the traditional teaching mode, the clarity of the content of this preclass teaching framework provides students with sufficient preparation time, so that students' individual value can be fully displayed, and the teaching effect is better.

Figure 5 shows the relationship between the simulated value and time of English teaching innovation platform based on mobile computing. It can be seen that the simulation values calculated by energy consumption optimization model and delay optimization model are higher, and the simulation values calculated by user mobile model are the lowest. With the increase of time, the simulation values obtained by the three models show a gradual downward trend. The increase of time will affect the accuracy of the teaching innovation platform, which will lead to the

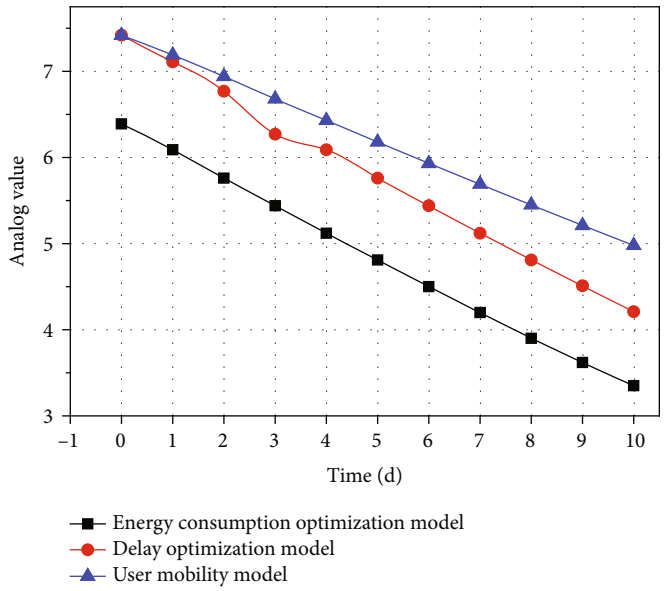

Figure 5: Relationship between simulation value and time of English teaching innovation platform based on mobile computing.

difficulty of platform data collection and reduce its accuracy to a certain extent, so it will lead to the decline of simulation value. The above results show that with the popularization of mobile computing technology, the amount of information expands rapidly, and a variety of communication methods are enough to attract learners' attention. Winning attention can occupy the market. The education industry is no exception. How to lock students' attention is a new challenge for teachers. The traditional teaching courseware, which organizes the content according to the knowledge system and takes the teacher's explanation as the main means, is no longer suitable for the current English teaching. Today, with the rapid development of mobile Internet, only through interesting task introduction, design beautiful and generous interface, simplify page content, highlight core content, and record 10~15 minutes of video teaching, which is more in line with students' learning characteristics. Breakthrough game courseware, interactive courseware with 3D animation effect, and QR code scanning can get the answer. It will become a necessary technology for teachers to make mobile courseware.

3.4. Information Push Technology in English Teaching Innovation Platform of Mobile Computing. The application of mobile computing English teaching innovation platform in classroom teaching itself shows an auxiliary role. Adopting appropriate teaching methods can give full play to the effect of twice the result with half the effort, let more people take the initiative to participate in it, gradually explore and feel the teaching content, and help students master knowledge in a short time. In the traditional college English teaching, the content resources are mostly based on teaching materials, and the content is not perfect and comprehensive, resulting in the unsatisfactory learning effect of students. In the process of teaching, students can be divided into different groups. With the help of the group function provided by the English teaching innovation platform of mobile computing, the goal of layering students can be achieved. Compared with the traditional layered classroom management and task arrangement, the English teaching innovation platform with the help of mobile computing can show better results, and the content is bound to be more comprehensive, in line with the teaching objectives and teaching requirements. Different groups of teachers can assign different tasks according to the characteristics of students to meet the requirements of teaching students according to their aptitude. Figure 6 shows the changes of information push rate and number of people on the English teaching innovation platform based on mobile computing. The information push rate represents students' understanding of mobile computing. The higher the information push rate, the more knowledge students will acquire. It can be seen that for people below 650, the push rate of energy consumption optimization model is low, and the push rate of the delay optimization model and user mobile model is high, and the two are almost the same. As the number of people increases to 800, the push rate of the energy consumption optimization model is the highest, followed by delay optimization model and user mobility model. When the number of people exceeds 800, the push rate calculated by the three models decreases sharply. In general, different mobile computing models get different push rates. According to the experimental results, the push rate of the delay optimization model is the best.

3.5. Application Mode of Mobile Computing in English Teaching Innovation Platform. The postclass stage of College English teaching mainly refers to the feedback and evaluation results. At this stage, through the group teaching in class, the evaluation process after class also needs to adopt the method of hierarchical evaluation. Different groups have differences in the evaluation content, so as to obtain the targeted evaluation results, so as to provide reference basis for the follow-up teaching optimization and the renewal of teaching content. At the same time, it is also necessary to

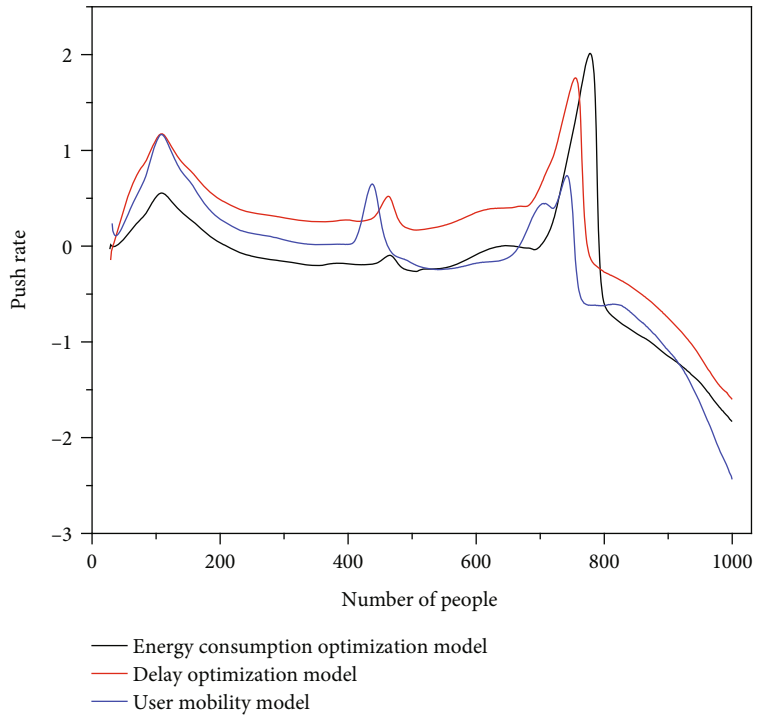

Figure 6: Relationship between information push rate and number of people of the English teaching innovation platform based on mobile computing.

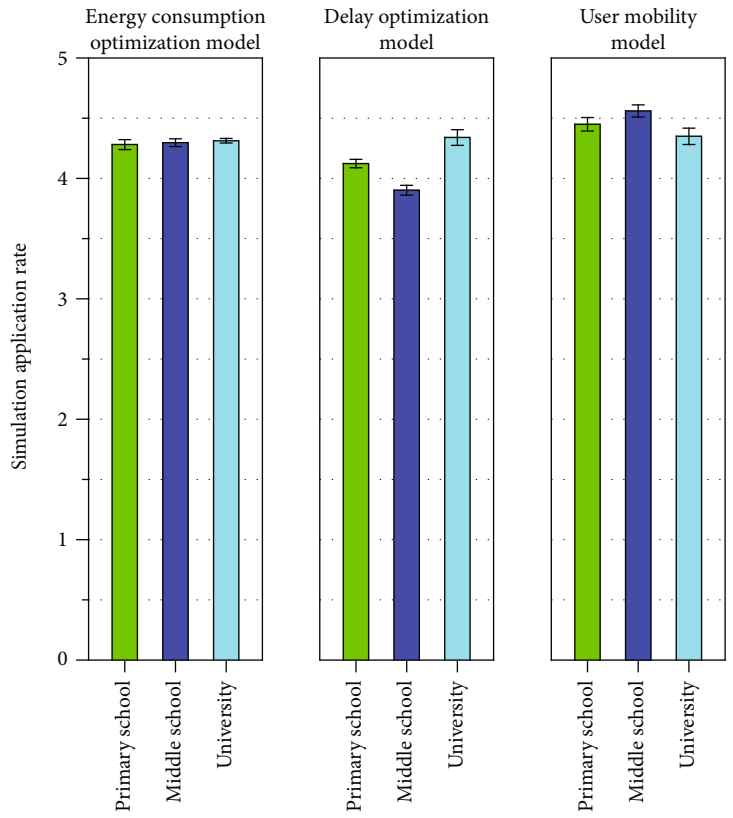

Figure 7: Simulation application rate of different mobile computing models in primary schools, middle schools, and universities.

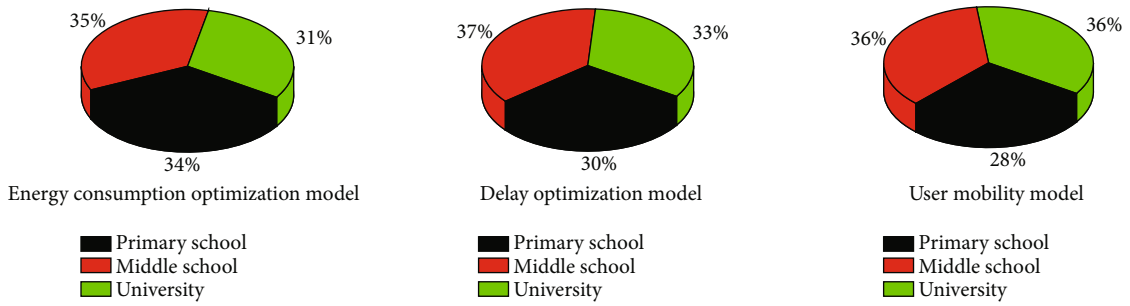

Figure 8: Classification of primary school, middle school, and university English education based on different models of mobile computing.

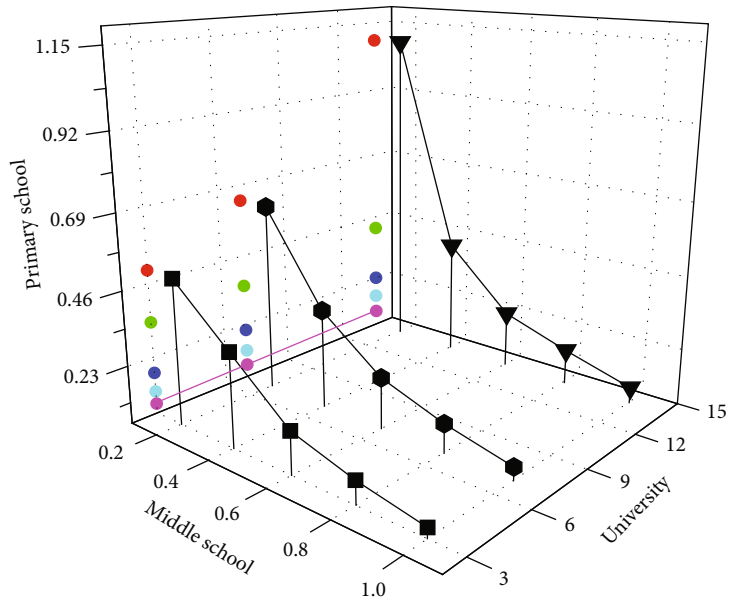

Figure 9: Application of mobile computing-based English teaching innovation platform in primary school, middle school, and university.

build a real-time communication channel by using the mobile computing English teaching innovation platform after class. For college English teaching, due to its particularity, it is difficult to achieve communication between teachers and students. In this case, the mobile computing English teaching innovation platform has built a good communication channel, which makes the communication between teachers and students more convenient and can provide good guidance for students after class. Once students encounter difficulties in English learning, they can use the platform to communicate with teachers in time, get the answers from teachers, and solve the English problems encountered in after-school learning. Figure 7 shows the simulation applications of primary schools, middle schools, and universities based on different mobile computing models. It can be seen that for the energy consumption optimization model, the application of the English teaching innovation platform based on mobile computing in primary schools, middle schools, and universities is similar, while in the delay optimization model, the application of universities is the best and that of middle schools is the worst. In the user mobility model, the application of middle school is the best and the application of university is the worst, which is just opposite to the delay optimization model. In general, the above results show that different mobile computing models have different applications in primary schools, middle schools, and universities. Only by integrating the optimization results of each model can we get the application of the optimal mobile computing English teaching innovation platform.

Figure 8 shows the classification of primary school, middle school, and university English education based on different models of mobile computing. It can be seen that the educational classification of primary school, middle school, and university obtained by the three models is similar, which shows that a good learning community has been formed between teachers and students to promote the smooth progress of teaching together. At the same time, students at different stages also discuss and communicate with teachers and report their learning results regularly. This is conducive to the realization and optimization of English teaching innovation platform.

Figure 9 shows the application of mobile computing-based English teaching innovation platform in primary schools, middle schools, and universities. It can be seen that based on different mobile computing models, students' English learning progress and effect can be well reflected.

Through the refinement of curriculum management and the process of professional knowledge, students' interest in learning is stimulated and recognized by students at different stages. Teachers can also feel more relaxed, and the classroom atmosphere is more active, which greatly improves the practical application of English teaching innovation platform.

4. Conclusion

In view of the rapid development of mobile computing, this paper establishes three mathematical models based on mobile computing; studies the optimization process of mobile computing model in detail; applies it to the design process of English teaching innovation platform in primary school, middle school, and university; and analyzes the impact of the three models on the design and application of English teaching innovation platform. The conclusions are as follows:

(1) The models based on mobile computing can be divided into energy consumption optimization model, delay optimization model, and user mobility model. The three models have their own advantages and disadvantages, but they can improve the accuracy of mobile computing

(2) In the design and application of English innovation platforms in primary schools, middle schools, and universities, the delay optimization model is the best, followed by user mobility model and energy consumption optimization model. Generally speaking, these three models have certain value in improving the concept of English teaching, but they still need to be deeply studied in future practice

Data Availability

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

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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