

Retraction

Retracted: Design of an Intelligent Virtual Classroom Platform for Ideological and Political Education Based on the Mobile Terminal APP Mode of the Internet of Things

Mathematical Problems in Engineering

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their

agreement or disagreement to this retraction. We have kept a record of any response received.

References

- [1] X. Zhang, X. Gao, H. Yi, and Z. Li, "Design of an Intelligent Virtual Classroom Platform for Ideological and Political Education Based on the Mobile Terminal APP Mode of the Internet of Things," *Mathematical Problems in Engineering*, vol. 2021, Article ID 9914790, 12 pages, 2021.

Research Article

Design of an Intelligent Virtual Classroom Platform for Ideological and Political Education Based on the Mobile Terminal APP Mode of the Internet of Things

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This article uses a software architecture model that combines two architectures, based on the traditional Android environment. Through comparative research on network technology today, Java technology has been selected as a tool for developing network education systems for future research and maintenance upgrades. The underlying network education technology relies on APP to enable education between teachers and students. This technology can not only give play to the advantages of computers in network data transmission, but also embody a new teaching model with teachers and students as the main body. It can solve various practical problems in teacher and student education and educate teachers and students by simulating the actual educational environment of the classroom and educational process using a variety of practical education management strategies. The experimental results prove that with the help of this virtual classroom platform for ideological and political education, it can provide students with more ideological and political learning resources, increase students' interest and time in learning, and promote the diversification of ideological and political learning methods. The quality of teaching is more conducive to the learning of knowledge points for students. At the same time, the system is operating in good condition. Switching between different interfaces is maintained at about 0.1 seconds. The system performance is also perfect. The overall analysis function is basically designed. It is a better learning platform.

1. Introduction

With the rapid progress of network technology and multimedia technology in today's society [1] and the increasing popularity of the Internet, the education model of various universities in our country is constantly innovating and changing. The current advanced professional classes pose a very obvious problem: traditional classrooms are a combination of knowledge classes and skill classes. "Knowledge class" means that students learn theoretical knowledge in the classroom, and "skill class" means learning skills in the classroom. Mobile devices and the Internet are two innovative platforms that have accelerated the process of computerization and facilitated the lifestyles of most people today. Rebuild a new classroom environment, break the

face-to-face limitation, and build a model suitable for modern students [2]. The new intelligent environment for learning is very meaningful. It is also an inevitable trend and choice that must be faced when the informatization of the social education industry develops to some extent.

The virtual classroom platform for ideological and political education in my country tends to gradually become a popular form of education, which further develops the virtual classroom platform in my country. Proposals have been made to apply network technology to university education in combination with the educational needs of the university, which provides an important foundation for the future application and development of network technology in university education. In particular, the outbreak of the new Crown Pneumonia epidemic this year has reached the

peak of development for virtual classroom platforms, allowing students across the country to continue their own learning using a variety of virtual classroom platforms. The system is operating in good condition, and the switching between different interfaces is maintained at about 0.1 seconds; the page loss rate is less than 0.5%, the operation interface is simple and clear, easy to operate, and the data with limited format and data type are verified, including client verification and server verification, using an error reminding mechanism to prompt the user to enter the correct data and the correct operating system.

The main work of this paper is divided into two parts. The first part is aimed at the ideological and political education virtual classroom platform to make it comply with the characteristics of high cohesion and low coupling. Introducing some functional technology and feasibility analysis, the second part is the design idea of the virtual classroom platform of ideological and political education and the construction of the platform, and testing it. The first chapter briefly introduces the overall background and development prospects of the project, including the technology to build the platform and the origin and role of virtual technology, and points out the innovations of this article. Chapter 2 provides a detailed introduction to the relevant functional technologies and feasibility analysis that underlie the project, while analyzing similar topics at home and abroad. Chapter 3 is to design the functional configuration of the platform and the design of the platform. Chapter 4 analyzes the platform implementation and the tests performed when the platform is built. At the same time, it summarizes the system execution status and performance. Chapter 5 is the conclusion part, which is a summary based on the experimental results of this article.

2. Design of an Intelligent Virtual Classroom Platform for Ideological and Political Education Based on the Mobile Terminal APP Mode of the Internet of Things

2.1. Related Work. Based on the concept of the Internet of Things, the American Power Grid Association has also set a prospect for the future development of the Internet of Things technology [3]. In 2005, the International Telecommunication Union expanded the concept of the Internet of Things and warned of the arrival of the Internet of Things era. The era of the Internet of Things makes it possible to share large amounts of data between different devices and transmissions on the network. The Internet of Things can be applied to all aspects of our life, work and study. For example, in the case of virtual classrooms, the Internet of Things uses middleware, network service technology, and event-based sensors to propose new solutions for virtual classrooms [4]. Abu-Sharkh et al. use a broadband network to communicate with smart devices, thus ensuring the reliability of the system [5]. Tiwari et al. implement sensor network applications in the dynamic virtual classroom learning environment and provide more energy-saving and sensitive intelligent control systems for virtual classroom learning equipment [6].

Virtual home education technology started late. Since the 1990s, with the support of national government agencies, some first-class cities have begun to pilot digital virtual classroom plans and initially introduced virtual classroom education technology in the sense of digital virtual classrooms. However, the home computer technology at that time was still very backward. The system using digital virtual classrooms as a demonstration project only performed simple automatic control, and there was still a long way to go before digitalization. However, according to the technology platform at that time, the telephone network was the only home network interface, and related digital technologies have been ingeniously studied based on the telephone network [7]. Raes et al. explore the virtual classroom learning technology by studying the home gateway controller [8]. Radovan and Kristl believe that the virtual learning classroom structure composed of gateways and Internet servers; the concept of the Internet of Things has been officially mentioned in China [9]. Yilmaz propose that as far as the current virtual classroom technology in family education is concerned, although we started late, its development is relatively fast [10].

2.2. Internet of Things. The system of the Internet of Things is very complex. It includes various applications such as electronics, communications, computers, and agronomy. By using IoT technology for data collection and reception, reliable transmission, intelligent processing, automatic control, etc., various production and transmission links can be established. Wait for the complete follow-up [11, 12]. However, if the network environment is different, the communication protocols may not be completely compatible. Traditional wireless networks include mobile networks and LAN wireless networks. These network communication plans are aimed at point-to-point or multi-point-to-point transmission and have higher communication goals and countermeasures [13].

2.2.1. IoT Architecture. Current IoT system models are not universal and lack a complete system structure. When building an IoT system, you need to consider network performance such as scalability, reusability, and security. It is necessary to summarize the research results of the Internet of Things architecture and the related theories and models of the wireless network architecture model. The main basis for designing and verifying the structure of the Internet of Things is still to simulate the actual scenarios of the Internet of Things, which should be combined with the existing examples of Internet of Things applications for summary and improvement, understanding the development direction of the Internet of Things. Finally, for different types of terminal equipment, it is necessary to consider relevant parameters, application technologies, and relevant standard specifications [14, 15], and a specific plan for the needs of users and the implementation of their functions is required. According to most research results at home and abroad, the Internet of Things system is divided into perception layer, network layer, and application layer, as shown in Figure 1.

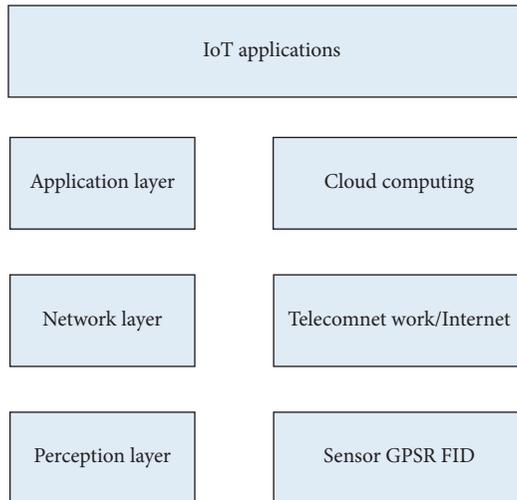


FIGURE 1: Internet of Things system composition diagram.

2.2.2. Perception Layer. The perceptual layer is the lowest structure of the Internet of Things. These are used for node analysis, processing, automatic management, and data collection during transmission of data to heterogeneous networks [16, 17]. Most of the changes in information in the environment are continuous and simulated. The information on the network is completely different, but different types of sensor devices are required to process the type of information retrieved [18], to be able to find and retrieve information and provide strong support for production and guidance.

2.2.3. Transport Layer. The IoT layer acts as a bridge between the perception level and the application level. The relevant information collected from the perception level is wirelessly transmitted to the terminal device. Commonly used are IEEE802.3-based Ethernet transmission technology, IEEE802.11-based Wi-Fi transmission technology and IEEE802.15.1xFoundation-based Bluetooth transmission technology, IEEE802.15.4-based ZigBee transmission technology, and 6Lan multitransmission technology and 6Low transmission technology mobile transmission technology, such as GSM, GPRS, and 3G, based on IEEE802.16, Mi MAX transmission technology, etc. Both 802.3-based Ethernet and 802.11-based Wi-Fi are IP-based network communication protocols, and 802.3-based Ethernet is the most widely used communication technology and multilayer structure in the IP protocol architecture. It can be implemented through other communication protocols and can also be applied to the Internet of Things architecture [19, 20].

2.2.4. Application Layer. Process the data transmitted by the network layer and send the results obtained after algorithm analysis to different systems [21], which facilitates the operation and use of end users, including production, management, and maintenance. The application layer is the outermost layer of the three-tier structure of the Internet of Things, and its most important function is processing, which

is to use cloud computing platforms for data processing. The application layer and the lowest perception layer are the most important cores of the Internet of Things. They have their own distinctive features [22]. The application layer needs to perform calculations, processing, and deep knowledge application on the collected data of the perception layer to perform data real-time control, management, and scientific judgment processing.

2.2.5. Virtual Classroom Process Based on the Internet of Things. In the Internet of Things, various things in the real world are deleted as processes, and relationships between different things are also deleted as connections between processes. The Internet of Things provides a more intuitive way to monitor networks of real-world relationships [23]. There are usually two ways to build the Internet of Things: top-down and bottom-up [24, 25]. The top-down construction method is an ontology-based construction method, which uses high-structure encyclopedias and other websites as data sources, extracts the constraints and rules of the ontology from them, and supplements them in the knowledge base, while the bottom-up construction method is simple. Identify entities, attributes, and relationships from data collected through pattern recognition, rulemaking, etc. Then add it to the flowchart, as shown in Figure 2.

2.3. APP Mode. Nowadays, mobile devices such as smartphones and tablets are becoming more and more popular, and people are gradually learning how to live with a variety of APP clients. Currently, all major e-commerce companies in the country have their own APP clients. The aspect is that APP mode has entered people's lives and has begun to shine. APP is not as monotonous as a smartphone client. Today, many smartphones allow you to wirelessly control your home appliances by downloading APP software with different features from different manufacturers [26–28]. Not only that, with the sudden emergence of the mobile Internet, more and more Internet companies and e-commerce platforms regard APP as one of their main directions for their sales promotion. A large amount of data show that the current flow of APP customers to e-commerce companies far exceeds the traditional Internet flow, and profiting through APP applications is also the development direction of large e-commerce platforms. There is evidence that the tendency of large e-commerce platforms to favor mobile applications is also obvious [29]. The reason is not only the increase in daily traffic, but most importantly the convenience of mobile phones and mobile terminals has added more users to enterprises and accumulated more users. Apps with a good user experience greatly increase loyalty and activity. Users thus play a key role in the company's revenue generation and future development.

2.3.1. APP Structure Design. The management application assumes the functional requirements of the application-level application; matches the functional requirements with the physical device layer, transport layer, and Android system;

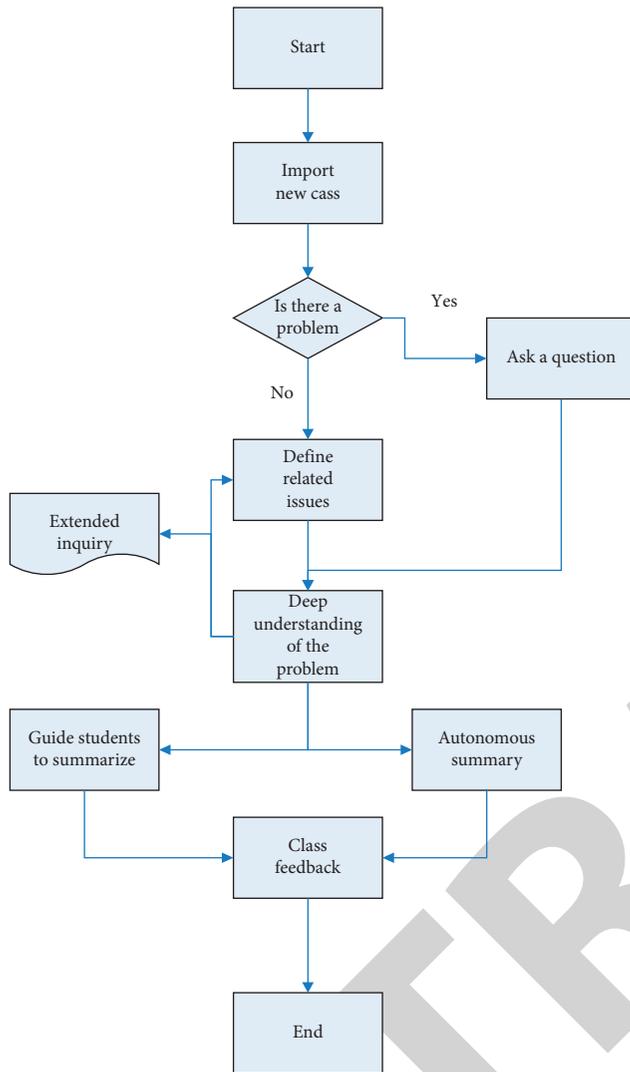


FIGURE 2: Virtual classroom flowchart based on Internet of Things.

and manages the specific execution of the functional functions. Service management level application is the core of system management service function. Its role is to perform a top-down mapping function, and this mapping relationship must have flexibility and long-term storage before it can be modified [30]. When the management service level application is installed and started for the first time, an associated function allocation table will be created through SQLite. At this time, since the terminal and device node information has not been received, the table only contains the corresponding Android operation data.

When the application-layer application wants to implement a specific function, the application layer application will access the SQLite function mapping correlation table and obtain the required data by reading, writing, etc., and transfer them to application-level management applications. In application management, the application level controls external devices according to the corresponding items in the SQLite table or performs corresponding Android operation functions. If there is no function between the management service level application and the application-level

application, the content of the associated SQLite function table entry remains unchanged [31]. The first logical value of each function parameter or operating parameter is 0 or 1, which represents the completed operation or the incomplete operation, respectively. The system creates a top-down functional relationship mapping relationship based on the above functions.

2.3.2. APP Design Process. When the system is running, the logical relationship between the App application layer and the App management service layer, and the App management service layer and the terminal node is the request feedback process. When the user wants to use the management service level application, they move the mobile smart device close to the NFC tag to the terminal node to receive terminal node and device information. When an application-level application wants to perform terminal, device or Android node functions, it will send a request to the service-level application through the SQLite mapping correlation table [32]. The management service layer receives the corresponding data information in the table according to the request and converts it into an executable terminal node. The functions and parameters are sent to the terminal node via Bluetooth. The terminal node executes the corresponding function after receiving the content and sending the result. The operation in the application is managed at the level via Bluetooth. As shown in Figure 3.

After the management level application receives the operation result information, it will update the corresponding items in the SQLite function mapping correlation table. After the application-level application receives the feedback, it will learn the execution mode of the operation mode and support the corresponding application-level functions in sequence. It is not difficult to see that the application-layer application only needs to perform identification-based operations without excessive participation in the physical device layer and the transport layer. The packaging of Android functions is similar to this [33]. Each related Android function is assigned a unique function number. When an application-level application needs to call a function, it will pass the function number and corresponding parameters to the service management application. The management service level application will complete the corresponding function accordingly and return the result to the application layer App.

2.4. Virtual Technology. The concept of virtuality can be traced back to 1959 when Christopher Strachey, a professor of computer science at Oxford University, first proposed the concept of “virtuality”. The virtual technology at this time is still in the initial stage, which is quite different from what is now called the narrow virtual technology, but it is still regarded as the earliest discussion on virtual technology [34, 35]. VMM abstracts computer hardware resources to form an abstract software layer above the physical hardware layer and realizes the duplication of a computer system originally owned by a single user into multiple copies and supports simultaneous interaction of multiple users. The

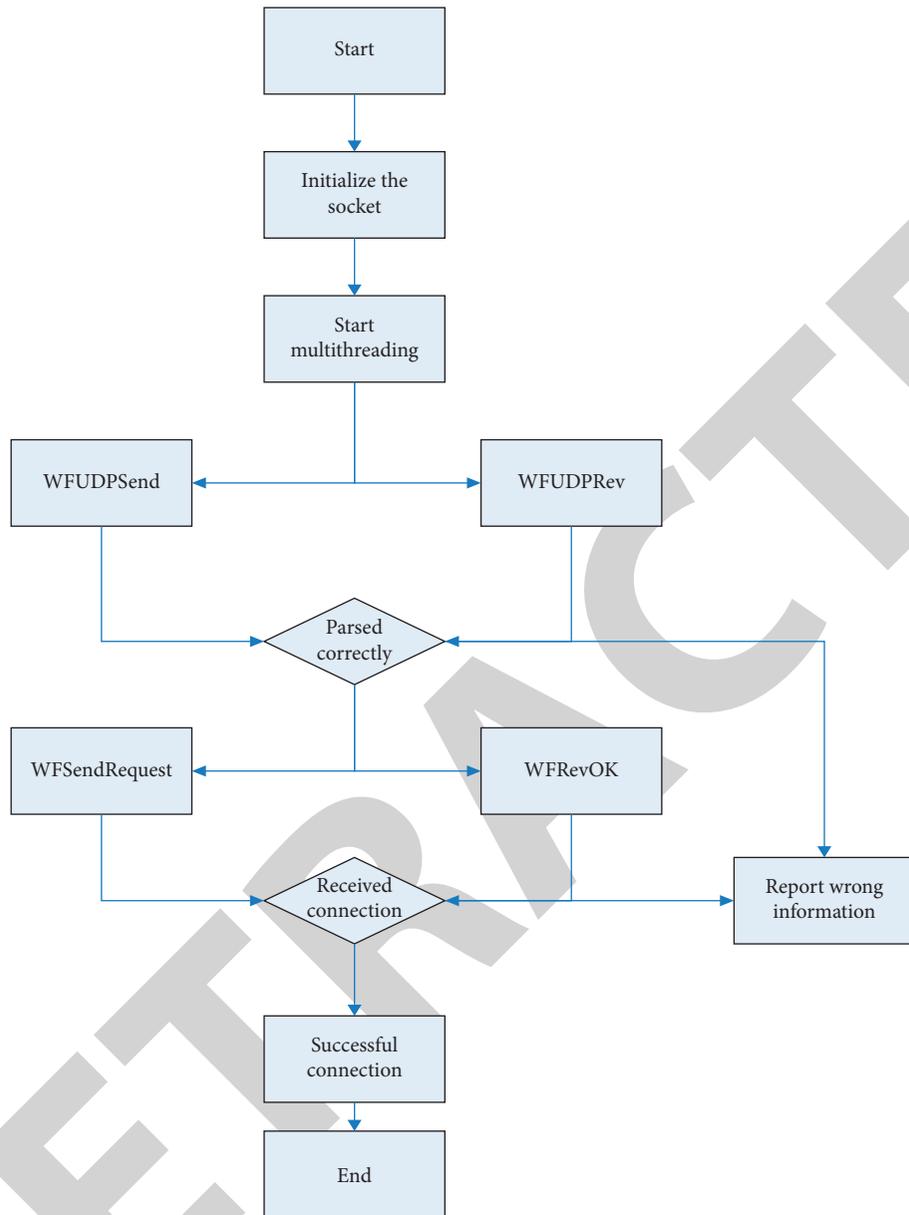


FIGURE 3: APP design flow chart.

virtual technology at this time has become the prototype of modern narrow virtual technology. According to different levels of abstraction, virtuality is divided into five levels.

- (1) The instruction set architecture level is virtual: It refers to the simulation of I/O devices such as processors, memories, buses, and timers of different architectures through software. The software converts the instructions running on the virtual machine into the instructions that can be executed by the machine to run on the hardware of the machine. Since each instruction needs to be simulated by software, performance may be affected to some extent.
- (2) Hardware abstraction-level virtualization: Hardware abstraction-level virtualization is a virtual machine

in the general sense. The hardware abstraction level has a very high degree of virtual isolation, supports different operating systems, has low risk, and maintains the same way as general hosts. However, since this level of platform can access the bottom layer of the host operating system, the effort required for users to install such a virtual machine is almost the same as installing a brand new computer, so the deployment cost of such a virtual machine is relatively high.

- (3) Operating system-level virtualization: Operating system kernel virtualization minimizes the cost of adding new virtual machines. Hardware abstraction-level virtualization is an abstraction of the actual physical hardware, and operating system-level virtualization is an abstraction of the host machine's

operating system kernel, providing an isolated operating environment for virtual entities. The operating environment for application software within these virtual entities consists of the host operating system, libraries, dependent software, specific data structures and file systems, and other preferences. If these operating environments have not changed, it is almost impossible for application software to find the difference between that environment and the actual operating system environment. This is the key to operating system-level virtualization.

- (4) Programming language level virtual: This level of virtual platform is responsible for directly translating high-level programming languages into hardware execution instructions, which has the advantages of cross-platform and cross-language.
- (5) Library-level virtualization: Most applications rely on a large number of runtime APIs for design. The use of dynamic linking to hide the implementation details of the library API can enable programmers to directly call the API, eliminating the need for understanding API implementation and overcoming different language bands, trouble coming.

2.5. Feasibility Analysis

2.5.1. Technical Feasibility. The ideological and political education virtual classroom APP mainly uses java technology, based on the Android environment and MySQL database, familiar with network protocols such as tcp, IP, socket, etc. For application development, it has complete functions and simple use characteristics and establishes a data integrity and security stable database. The development technology of the ideological and political education virtual classroom APP has high feasibility, and the developers have mastered certain development technology, so the development of the system is feasible.

2.5.2. Operational Possibility. The login interface of the ideological and political education virtual classroom APP is simple and easy to operate. The common interface window is used to log in to the interface, and the mobile phone APP is used for access operations. Users can access and operate as long as they use their mobile phones. The development of this system adopts java language development; based on Android environment, these development environments make the system more perfect. This system has the characteristics of easy operation, easy management, and good interaction, and it is very simple in operation. So this APP can be developed.

2.5.3. Economic Feasibility. The dynamic nature of the creation of the ideological and political education virtual classroom APP service function chain is manifested in the use of container-borne security functions that can be deployed in seconds. When the request arrives, first

dynamically create container function instances according to the needs, and then connect the function instances into chains in order according to the service requirements to pass the specified flow. The required hardware and software environment are easy to buy in the market, and the program development is mainly the development and maintenance of the management system. Therefore, the program does not require high human and financial resources, and the system is not very complicated, the development cycle is short, and it has high economic feasibility.

3. Experimental Research on the Design of Intelligent Ideological and Political Education Virtual Classroom Platform Based on the Mobile Terminal APP Mode of the Internet of Things

3.1. System Function Composition. The design of virtual classroom environment must have high ecological effectiveness and must be combined with newer human-computer interaction technology, so that ordinary students can interact with students, objects, and virtual classroom environment in a relatively humanized way. In order to achieve the above goals, it is necessary to first collect the rich teaching experience of all professional teachers and collect all professional teachers through questionnaire surveys, discussions, and self-reports. Ordinary students should have more consistent knowledge and teaching experience and design corresponding classroom virtual teaching situations as much as possible based on the collected opinions. The experiment platform is mainly composed of a main system and four subsystems to create a teaching application experiment system, which combines interactive simulation, situational interaction, teaching interaction, resource management, and teaching evaluation.

The system platform supports the introduction of scene packages into the classroom, supports the natural environment system, supports the time system, can express the change of time, light, and shadow, and has something in common with the classroom environment. Teaching materials, audiovisual equipment, etc. support the display of graphic teaching materials in classroom lessons. Users support image editing and teaching text content.

They support importing, managing, and deleting 3D characters; support adding and modifying character animation; support IK character animation technology to achieve special effects, support multiple UI switching sets; support 2D and 3DII systems; and support mouse and gesture functions.

3.2. Platform Design Process. From the start of demand analysis to the final use of the platform, the development of virtual classroom projects has gone through multiple links. The main software used is Unity 3D software and SteamVR software. After confirming the start of the project, perform the project requirements analysis. According to the specifications of the virtual classroom website, it is combined with the actual educational needs and actual educational videos of

the interactive virtual reality department with professional teachers in the classroom. Through questionnaire surveys, discussions, and self-reports, we collect the needs of teachers and students of different professions, design the corresponding virtual education situation in the classroom as much as possible based on the collected opinions, and analyze the prediction content and position: I will. Classroom. The basic process is shown in Figure 4.

3.3. Metrics for Platform Evaluation. The indicators for evaluating a system are generally evaluated according to two points. One is its system performance and the conversion flow between pages is not smooth; the other is the running status problem, which is stable and unstable and can accept the maximum number of visits. Of course, the beautiful page is the most basic. These are the key indicators for evaluating the quality of a system.

3.4. Test Subject. In this experiment, we will test the system performance of the platform and experiment on different models, each model operating system 10 times, a total of 1000 times. The second is to test the running status and constantly test the maximum amount of visits it can accept in the background. At the same time, a questionnaire is issued to users to investigate the user's experimentation on the APP interface and the aesthetics of the page and conduct experimental analysis and postsystem optimization.

3.5. Experiment Procedure

3.5.1. Experiment Preparation Stage. We will test the system performance and operating status of the platform, select students from the Political College of X University, and let them use the software for a period of time to learn related video courses online. Then according to the needs of the topic, according to the research information, combined with the interviews of political experts and network technology experts, and referring to related books and theoretical knowledge for preparation, the video tutorials familiar with the topic content are designed as questionnaires.

3.5.2. Experimental Stage. Questionnaires are issued to users to investigate the user's experimentation on the APP interface and the aesthetics of the page and organize the data for experimental analysis and subsequent system optimization.

3.5.3. End of Experiment. After testing the overall level of the experimental class and the control class, make sure that the type of question and the difficulty of the test paper are the same. Compare the performance differences of the two classes and investigate whether the level of the experimental class is significantly improved relative to the control class to determine the advantages of our online multimedia education platform for college physical education compared with the original learning system of X University.

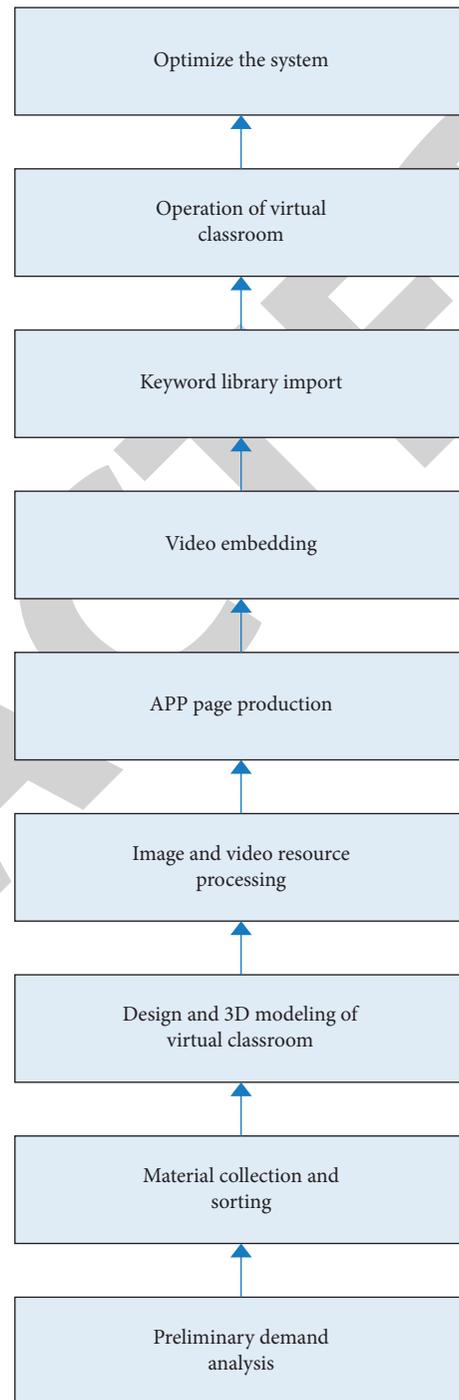


FIGURE 4: Platform design flow chart.

3.6. To Gather Data. In order to obtain accurate data to compare and analyze the feasibility and effectiveness of this experiment, this paper uses the Cora dataset and the IMB dataset. Cora data set is used as a common entity analysis and evaluation data set. For example, the entity analysis process based on Markov logic network adopts Cora.

TABLE 1: System function test table.

Functional module	Function name	Test steps	Test results
<i>Login/registration module</i>	Registered	Register operation	Successfully registered
	Login	Perform login operation	Successfully logged in
<i>Add/query information about courses, teachers, teachers</i>	Add class	Add management	Added successfully
	Query classroom number	Query teacher number operation	Search successful
	View teacher information	Query teacher information	Search successful
<i>Delete/modify course information</i>	Delete course information	Delete course operation	Successfully deleted
	Modify course information	Modify course operation	Successfully modified
<i>Other functional modules</i>	Add room	Add room operation	Added successfully
	Add keyword information	Add keyword information operation	Added successfully
	Manage keyword information	Manage keyword information operations	Management success
	Upload avatar	Upload avatar	Upload successfully

4. Design Experiment Analysis of Virtual Classroom Platform for Intelligent Ideological and Political Education Based on the Mobile Terminal APP Mode of the Internet of Things

4.1. Platform Testing

4.1.1. *System Function Test.* The function test of the system mainly includes the main functions such as registration, login, device search, adding mode, adding courses, viewing the classroom list, and viewing the teacher information list, as shown in Table 1.

In the process of testing the monitoring effect, through the use of specific video formats for background sampling, encoding and other technical tests, the server and other hardware are repeatedly tested until satisfactory test results are obtained.

4.1.2. *Running Status Test Analysis.* Here we test the running status of the system and test the maximum number of users who log in to the background system at the same time. We select 100, 500, 1000, and 2000, respectively, for testing. Will it cause system lag or error? (0 means no, 1 means yes) Draw conclusions, analyze, and put forward corresponding countermeasures and suggestions on this basis, as shown in Figure 5.

From Figure 5, you can see that when 500 people perform system login operations at the same time, they start to feel that the system is a little stuck. When 1000 people do the system login operation at the same time, the system starts to make a little error, but at least 100 people do it at the same time Taiwan system login operating system seems to be unstacked and causes an error.

4.1.3. *System Performance Test Analysis.* After confirming that the fixed port network is turned on, connect to the central controller of the system and set the Wi-Fi routing parameters of the central controller. System performance

monitoring mainly includes web page loading speed, system data loss data rate, return speed, and other parameters, as shown in Figure 6.

It can be seen from Figure 6 that the page loading speed and return speed of the system are within 0.1 seconds. According to the patience of humans using software refresh, it can be known that the interface efficiency of the system is qualified, and the loss rate of the 4 groups of pages is 0.3% on average. This may be a problem of the system itself, or it may be a problem of the network, but this is a direction of system optimization in the later stage.

4.2. *User Satisfaction Analysis.* In order to verify the effectiveness of the coordination strategy based on the maximum operability proposed in this article, a questionnaire was issued to users to investigate the user's experimentation of using the APP interface and the aesthetics of the page and collected data for analysis, which is a later system The optimization put forward corresponding countermeasures and suggestions, as shown in Figure 7.

From Figure 7, we can see that users are happy with the experiment using the APP interface and page aesthetics, and students are happy to use this APP. With the help of this virtual classroom platform for ideology and politics education, it provides students with more ideology and politics learning resources and increases learning interest and time and a variety of ideology and politics learning methods, while it can promote politics.

4.3. *Analysis of the Development of Virtual Classroom Platform in Recent Years.* Over time, the integration of emerging technologies and virtual classroom platforms has continued to increase. More and more online course apps are emerging, and more and more colleges and universities choose some courses to teach in the form of online courses. Here we analyze the development of virtual classroom platforms in recent years and draw a picture, as shown in Figure 8.

It can be seen from Figure 8 that, with the continuous advancement of technology, the functions of the virtual

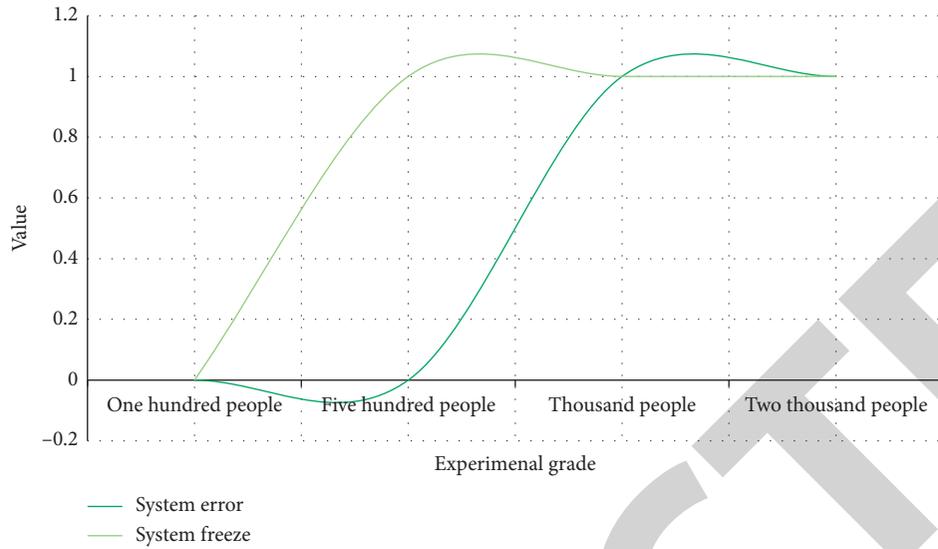


FIGURE 5: Running state test chart.

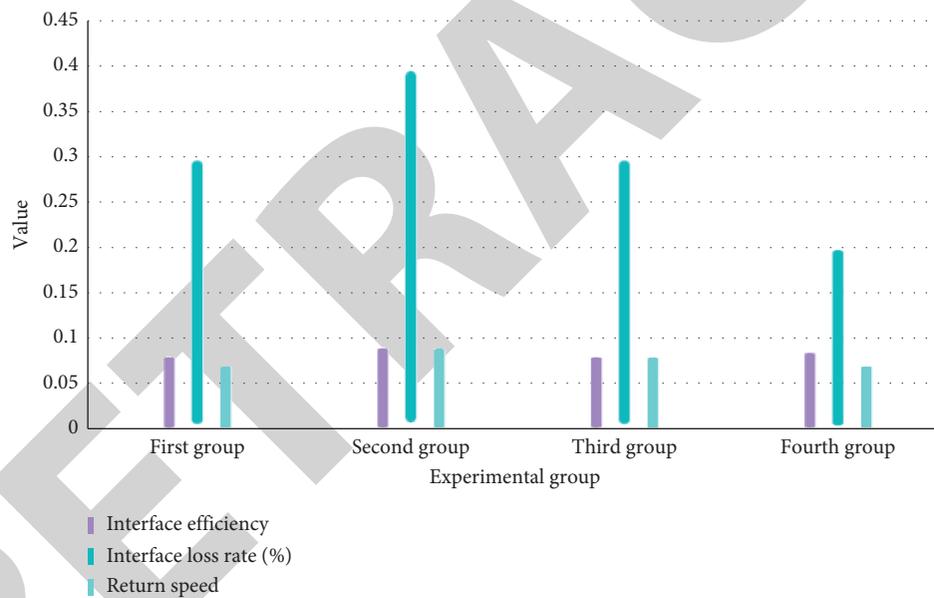


FIGURE 6: The loading speed of the 4 sets of experiments and the system data loss data rate graph.

classroom platform are becoming more and more mature. Just when the epidemic broke out this year, the already mature system completely replaced the face-to-face instruction. The virtual classroom platform this year is also the

fastest growing time. Although face-to-face teaching has been restored now, with this technology, the virtual classroom platform will gradually replace the face-to-face teaching mode in the future.

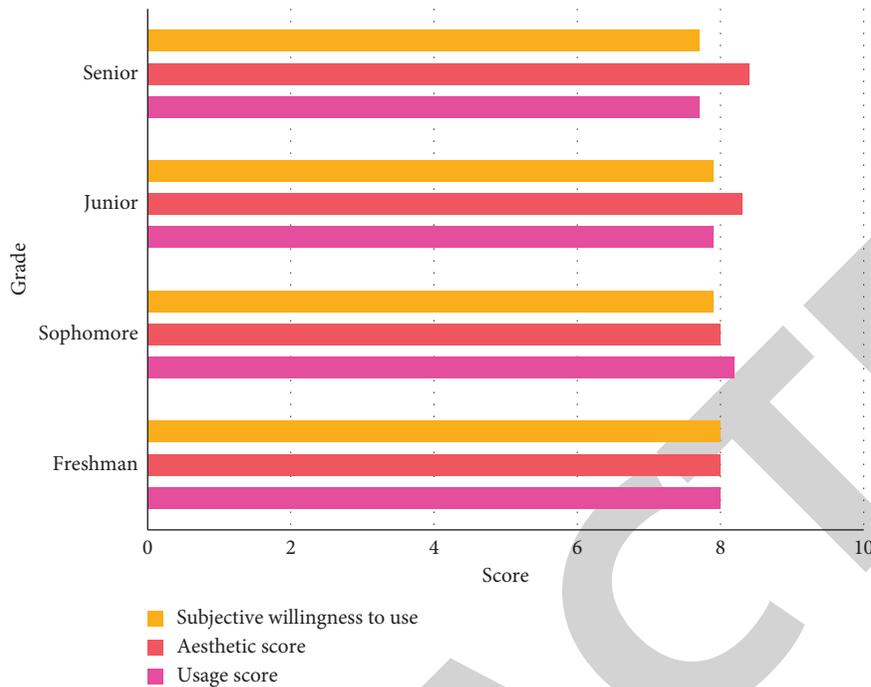


FIGURE 7: Customer satisfaction analysis graph.

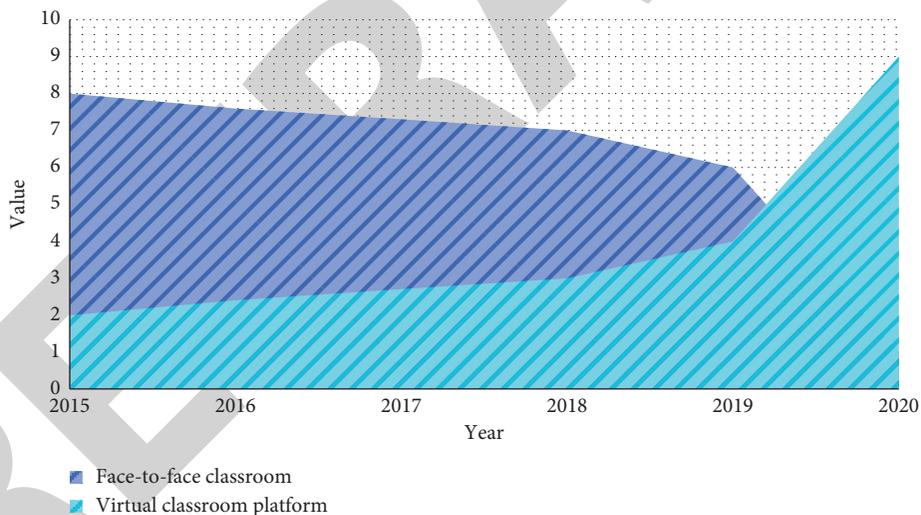


FIGURE 8: Analysis of the development of virtual classroom platform in recent years.

5. Conclusions

This system is an Android-based virtual and virtual classroom learning platform. The system can operate household appliances and perform remote control. The material is easy to install and has excellent expandability. For software, you can perform remote control and design. The interface is simple and easy to use, and the graphics features are easy to learn and use. Internet of Things is designed to meet communication and control requirements, smooth switching of various interfaces is maintained, and system performance is perfect. After designing the system operation,

complete the system implementation interface and complete the system operation test and system performance test related work to confirm that the system operates normally. The focus of this design is to design intelligent control software on the Android platform. This design uses XML technology, the Android SDK development kit, and MyEclipse development tools.

The intelligent virtual classroom developed using IoT technology and IoT mobile technology interconnects the physical classroom and the virtual platform in the classroom, eliminating time and space constraints and conducting interactive teaching, evaluation, communication, and real-

time interaction. Providing students with convenience to study anywhere will help them increase their interest and enthusiasm for learning. This is a bold effort in education. At the same time, it solves the current situation that students in traditional classrooms do not listen to classes, but just lower their heads to play with mobile phones, making mobile phones a necessity in the classroom, effectively helping teaching activities, and arousing strong interest among students. Used for learning, active classrooms, real-time resource exchange without learning and communication can improve the teaching effect of teachers. This is a good way to reform education and teaching, and it is worthy of research and promotion in universities.

By improving the performance of virtual reality equipment, technological advancement and educating teachers in virtual reality technology, virtual reality technology is expected to drive the development of education for a period of time. In order to help students create better knowledge for teacher education, the virtual classroom system must solve two main problems, namely, the design of the virtual classroom environment and the realization of the virtual environment that users can operate. The design of the virtual learning environment represented by virtual classroom research has entered the stage of practical research, and the structure of the virtual classroom has gradually become clear. This new teaching method has gradually been highlighted, and there is still much room for improvement and perfection. This paper confirms the design idea of the virtual classroom environment by analyzing the requirements of the virtual classroom environment and combining the development process. We hope to provide a practical reference for the design of virtual classroom environment and help future virtual classrooms conduct practical research.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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