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Research Article

Design of Education Information Platform on Education Big Data Visualization

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Big data visualization in education plays an essential role in understanding and uncovering complex educational laws and is increasingly becoming an essential topic in the current research fields of educational information science and educational management. In the context of China's new curriculum reform, research on big data in education is in the process of deepening. A series of high-tech information technologies represented by big data technology is widely used in education, thus promoting intelligent campus construction. Based on this, the researcher combed through the relevant literature and found that there is still much room for improvement in the current research on the visualization of education big data, especially the research on the design of education informatization platforms based on the visualization of education big data. This study first summarizes the current and practical use of educational visualization research and finds that big educational data generated in the educational process plays an essential role for students, teachers, and teaching administrators. Visualizing big educational data provides an optimized way for students, teachers, and teaching administrators. Therefore, this paper designs the framework design process, platform selection, related technology introduction, platform implementation, and functional analysis of the educational information platform visualized by big data and conducts system testing. Through the research of 250 customers, it is concluded that the platform satisfaction of educational information visualized by big data is 92.4%, the satisfaction of individual function is 95.6%, system ease of use is 93.2%, and the satisfaction of system compatibility is 93.6%.

1. Introduction

The Internet of Things (IoT) has transformed into an important emerging technology that is inevitable in all fields, as it simplifies human work [1]. Computer researchers define "big data" as "data that is so large that it cannot be cleaned, managed, analyzed, and organized into human-comprehensible information in a limited amount of time using manual methods" [2]. Education big data refers specifically to big data applied in education. Big data has dramatically changed the way businesses, management, and research departments operate and manage, and it is considered an emerging fourth scientific paradigm called "data science" [3]. Innovative education is an essential component of China's current educational reform and development, exploring the deep integration of technologies such as extensive data analysis, IoT sensing, and artificial intelligence with educational management [4]. However, the data generated in the innovative education environment are usually large and complex. However, it is usually difficult for teachers, students, and school administrators who do not master data mining and analytical processing techniques to process and interpret these data [5].

It has been shown that current research on educational data visualization is focused on professional researchers and lacks relevant theoretical guidance, thus resulting in low acceptance of visualization applications by students, teachers, and school administrators [5]. Currently, big data visualization in education in China is still in its infancy and faces more challenges in theoretical exploration and technical application [6]. The current research on big data in education in China involves relatively scattered topics. It lacks systematic sorting, making it difficult for most

researchers to clarify the analytical models and essential technical methods off issues related to big data in education [7], providing more research space for scholars.

With the increasing speed of science and technology development, the integration application process has been continuously promoted, supported by the high-tech information technology represented by big data. The digital level of teaching has been continuously improved, making the teaching management based on education big data, which present significant cross-service, low effort, high density, and interactive feedback efficient features [8]. In the current information age, relying on information technology and Internet technology to promote the continuous refinement of teaching management mode, improve the management level, and optimize the quality has become the inevitable trend of the current intelligent campus construction. Students, teachers, and managers are necessary conditions for practical teaching activities. However, traditional teaching resources are mainly distributed by education departments and developed by teachers, which cannot fully meet students' personalized learning needs.

Moreover, the speed of resource updating is slow. The emergence of big data and cloud computing technologies provides new ideas for the construction and management of teaching resources. Cloud computing and big data enable teachers and students to share educational resources stored in cloud services, analyze various unstructured data to uncover hidden information values, and provide teachers and students with the most appropriate resources for teaching and learning [9]. Big data and cloud computing grasp teachers' and students' needs for learning resources based on their browsing traces and filter out quality teaching resources. By doing so, we can provide better teaching for teachers and more accurate services for school administrators. In terms of the current situation and trend research, researchers such as He et al. conducted a statistical analysis of the literature on educational data mining published outside the world through bibliometric and content analysis methods. They found that foreign research is rapidly developing, Chinese research started later than foreign research, and progress is relatively lagging [10].

The intelligent campus established based on big data is a new teaching platform and management model. It insists on the Internet and big data to plan the campus environment, learning, and living environment and build a comprehensive teaching and management service system. It truly achieves intelligent, data-oriented, and collaborative development [11].

In student management, schools need to strengthen the application of big data technology and effectively build management resources and work platforms. It can guarantee a deeper implementation of student management's various tasks and help promote the in-depth development of school education.

At this stage, scholars' definition of big educational data mainly takes the subject that generates big educational data as the starting point. The definition of big educational data in the academic field mainly covers two aspects: in the broad sense, the behavioral data generated by humans in daily educational activities are the primary sources of big educational data, and its practical application process presents significant hierarchical, temporal, and contextual characteristics; while in the narrow sense, the learning data of learners are big educational data, and student management systems, online learning platforms are the primary sources of big educational data. Student management systems online learning platforms are the primary sources of big educational data. Due to the rapid development of information technology, big educational data can be applied to the whole education process, such as: reflecting and recording educational materials knowledge receptivity. [12].

The metadata theory of teaching management uses data mining, analysis, and other methodological processes, which can refine and visualize data. The atomized data descriptions are formed, and they are applied to administrators, learners' predictions, and intervention work. So, promoting personalized learning programs and service programs customized for smart campuses provides powerful information support for refined and timely feedback.

At the elementary level of analysis, metadata is a data information property. Before using big data technology to collect data related to intelligent campus business, it is necessary to determine the unified specification of business metadata. Business metadata can link the complex half structured and structured big data-based data unified. As a result, the teaching management of primary and secondary school innovative campuses based on big educational data can adapt to the fast pace of information development to optimize teaching quality, refine management measures, and better serve primary and secondary school students [13]. The current characteristics of information technology in Chinese elementary schools are: first of all, high information technology injects new vitality into the student education management mode. In the context of the current new period, high information technology is widely recognized and applied in various fields of society. The combination path of information technology and education has also begun to be explored in education. As an essential foundation to support the orderly development of each educational link, the teaching management mode needs to be injected with fresh blood and vitality in the process of information-based teaching reform. Otherwise, it will make the student education management mode disconnected from the teaching development trend in the new era and eventually make it difficult to achieve the new talent education goal. The combination of big data technology and teaching enables the introduction of advanced educational resources. Advanced educational resources enhance learning efficiency and overall teaching quality [14]. The education field is also actively exploring combining big data technology with teaching management [15]. Huda and other scholars point out that various advanced technologies are widely used in the teaching under the rapid development of science and technology, such as multimedia teaching platforms. In the actual teaching process, most high-quality teaching resources are introduced by information technology and effectively transformed by multimedia equipment to ensure that Students can break the constraints of time and space

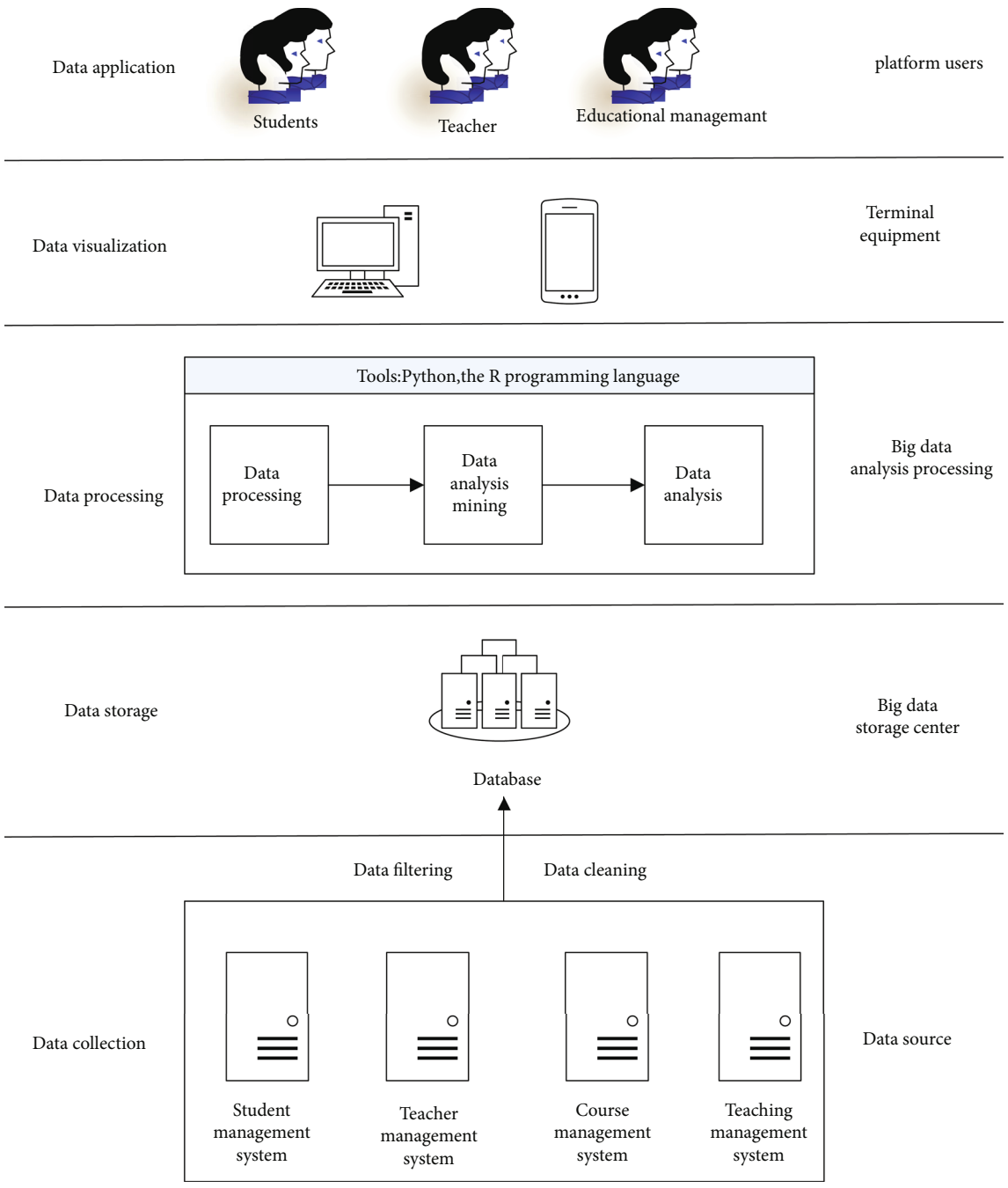

Figure 1: Education information platform system framework.

and move quality teaching resource information anytime and anywhere [16]. The last common situation is the single form of student feedback. The traditional teaching model focuses on student behavior norms, which makes its practical application process more significant restrictions on the development of students' personalities, students are prone to fearful mentality, daily learning. Life is reluctant to express their basic ideas, more severe cases will lead to psychological problems of students [17]. Therefore, from the perspective of the current teaching reality, students' psychological problems have become fundamental problems that need to be faced in education, restricting students' overall development and leading to social problems from a long-term perspective. In addition, scholars such as Grove believe that schools currently do not have substantial control over information systems. The reasons are twofold: one is that traditional management ideas influence school managers, and the other is that they do not recognize the importance of information-based teaching management systems, which results in the burial of the functional value of the system. The traditional teaching management model is not effectively reversed, which ultimately restricts the teaching management reform process to continue to deepen [18].

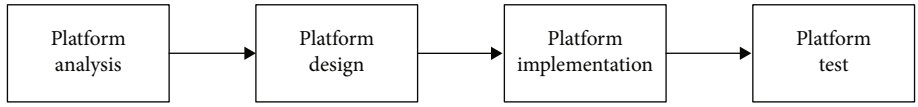

Figure 2: Education informatization implementation flow chart.

2. Design of Education Information Platform Based on Education Big Data Visualization

2.1. Framework Design of Education Informatization Platform Based on Education Big Data Visualization. The framework of the education informatization platform based on education big data visualization is designed based on the extensive data visualization processing process. The significant data visualization process is mainly divided into six processes: data collection, preprocessing, data storage, data processing and analysis, data visualization, and application. In the process of data collection, the subfunctional modules of the platform are mainly used as data sources, and the collected source data are cleaned, filtered, and stored in the big data storage center of the platform. Furthermore, in the big data storage center to ensure the security of the data, MD5 encryption technology is utilized to protect the confidentiality of the data (confidentiality) and the digital watermarking technology is utilized to protect the integrity of the data.

Python and R language tools analyze and visualize the data and display it to the terminal device. The platform users can get the visualized data for the application by sending commands to the terminal device. The specific processing flow is shown in Figure 1.

2.2. Development Platform Selection of Education Informatization Platform Based on Education Big Data Visualization. The primary purpose of constructing the educational information platform for big data visualization is to allow users to visualize and query the platform data information. Therefore, the open-source LAMP architecture [19] was used in the web development of the platform, and the B/S (referring to the browser/server model) structure was used in the browsing method. In addition, an extensive data visualization process framework was used in the overall system application framework of information technology.

The "LAMP model" is developed using Linux operating platform, Apache server, MySQL database, and PHP language [20]. This mode of development is the mainstream enterprise-level WEB development technology. Not only is the language simple and easy to develop but also it is accessible in the implementation of high efficiency. Moreover, MD5 data encryption technology can ensure the security of cross-platform data operation and reduce the risk of platform and data migration. So it is accessible to education information platform users and accesses the platform through different channels.

B/S structure (browser/server mode) is a network structure model, and the user only needs a browser to access the database and interact with the database information. In this mode, the platform functions are distributed on the server. The server performs data processing and analysis for the client's request, visualizes and processes the output, simplifies the platform structure, reduces the difficulty and cost of development and maintenance, and allows for multilayer module development, robust scalability, and accessible platform upgrade and function expansion.

2.3. Introduction-Related Technology

2.3.1. The Technology of WEB3.0. WEB3.0 technology has intelligent features, and data can be freely integrated, which is effectively aggregated using a variety of terminal platforms. The education information platform based on visualizing big educational data using WEB3.0 technology can interact with the big data storage center and mine the information. The users using the platform have more personalization, precision, and intelligence in retrieval and use [21], to meet the platform used in different terminals and access to the platform and the personalized needs of different users.

2.3.2. The Technology of PHP. PHP technology is an open-source scripting programming language with simple development, very scalable and compatible, and runs on different platforms. For example, the education information platform's front-end web development and back-end functional modules are programmed with PHP to better interact with the database center for information.

2.3.3. The Technology of Database. The data used in the platform's big data storage center is MYSQL, mainly because the MySQL database is an open-source relational database management platform. MySQL saves big educational data generated in the education process in different relational tables to increase data mining and analysis speed and flexibility in the education informatization platform. In addition, MySQL supports multithreading, which can make full use of CPU resources and satisfies multiple users to call and use data resources simultaneously [22].

2.3.4. The Technology of Python. Python is an interpreted scripting language widely used in data mining and analysis and is characterized by its free and open-source nature. Data analysis and visualization processing in educational informatics platforms are mainly done using Python because Python provides efficient data structures and integrates many types of libraries [23]. The informatization platform uses Python to calculate large amounts of matrix data and analyze the entire data, Pandas to process and convert various data types, and Matplotlib to visualize and output the data for easy understanding and application.

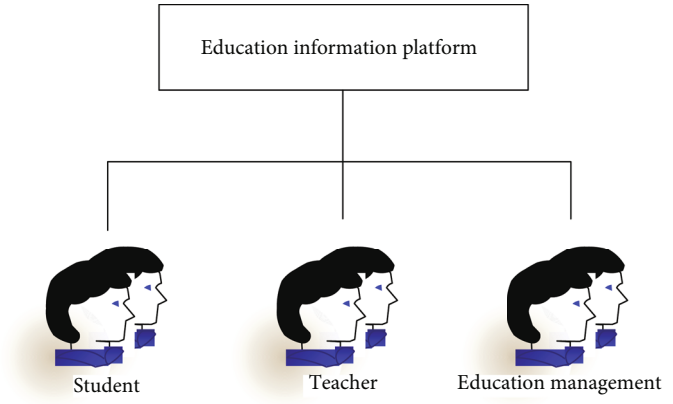

Figure 3: Functional requirements of the educational information platform.

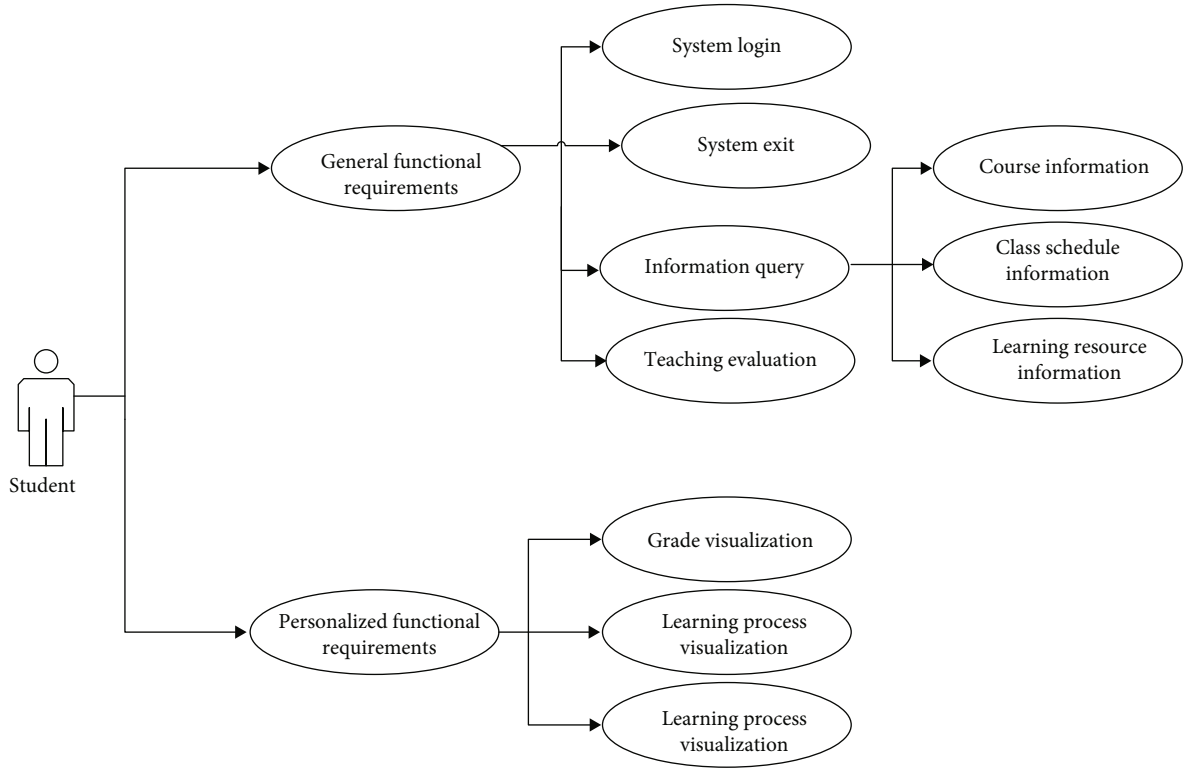

Figure 4: The use case of a student.

3. Realization of Education Information Platform Based on the Visualization of Education Big Data

3.1. Analysis of the Realization Process of Education Informatization Platform Based on the Visualization of Education Big Data. The implementation of big data-based education informatization platform is divided into 4 stages, as shown in Figure 2.

The first stage of platform analysis mainly analyzes platform functionality, platform operation environment, and platform development feasibility. The functional analysis of the platform is mainly through the analysis of the three different roles of platform users: students, teachers, and administrators for regular demand functions and personalized demand functions and the production of user demand legends; the operating officer environment and analysis of the platform mainly contain the development environment of the platform and the operating environment of the platform; the feasibility analysis of the platform is mainly the feasibility analysis of technology, operation, and management.

The second stage about platform design: the platform design stage is mainly for the functional requirements of the platform's architecture design, including the platform's internal functional modules and the design of the platform database tables.

The third phase of platform implementation: According to the function modules of platform design and data design,

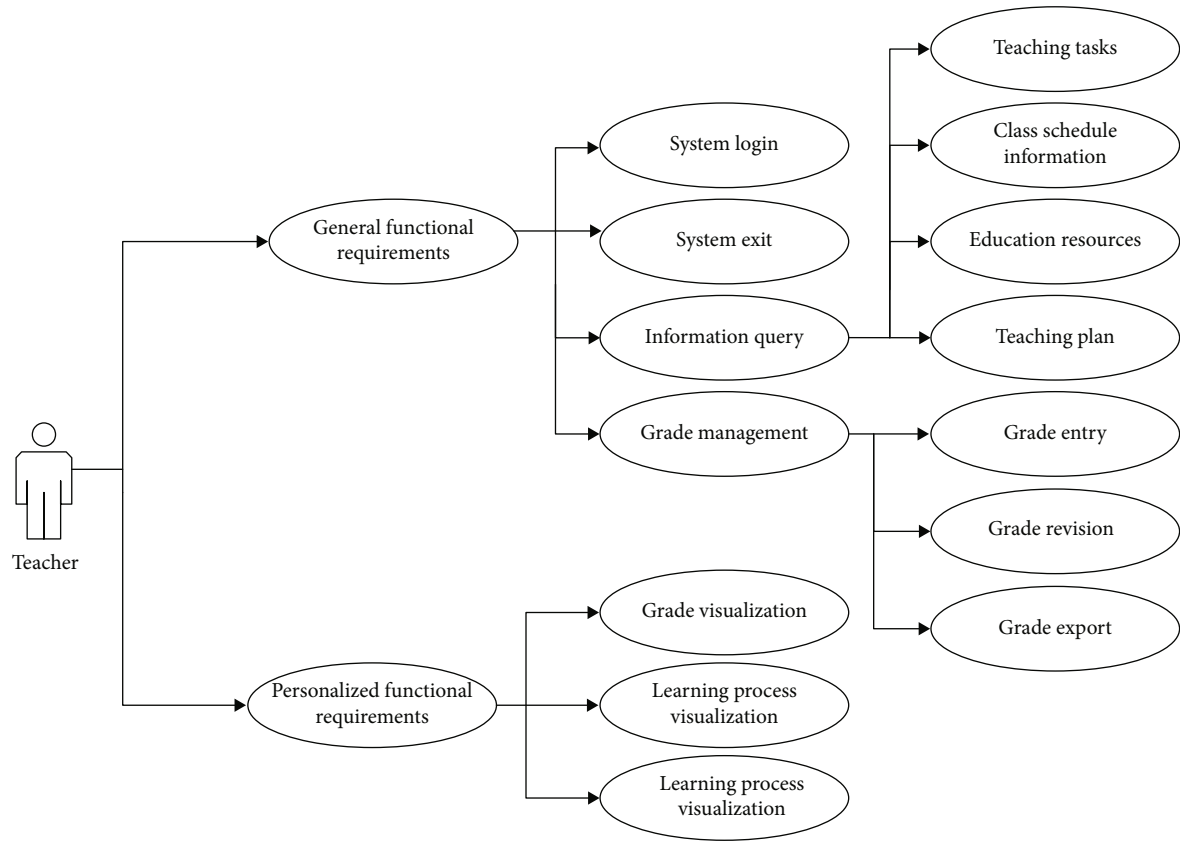

Figure 5: The use case of a teacher.

the platform design realizes the programming development of the front and back end—finally, the development of each subfunction module is to learn the application of the whole platform..

The fourth stage about platform testing: the whole platform of the educational information platform is tested by developing testing methods and conducting research on users, and the platform is optimized through test results and research results.

3.2. Platform Analysis. Students, teachers, and teaching administrators are the main application subjects in the education information platform. In educational management, personnel analyze the generated data and provide visualizations to users. This approach helps students optimize their learning and personalize it [24]; of course, visual data analysis helps teachers have a more comprehensive understanding of students' learning behaviors and outcomes and optimize teaching and learning management methods more [25]. In addition, teaching managers can make big data generated from the education process for analysis and make scientific decisions [26]. Therefore, the needs of the education informatization platform are analyzed from functional and nonfunctional requirements.

3.2.1. Analysis of Functional Requirements. The users of the education information platform are students, teachers, and administrators. According to the system requirements analysis, the main functional requirements of the education information platform based on big data are to meet the standard functional requirements of students, teachers, and administrators, and personalized functional requirements. The specific functional requirements of the system are shown in Figure 3.

(1) Analysis of the Functional Requirements of the Student Side. The functional requirements of the student side are divided into general functional requirements and personalized functional requirements. The functional requirements are mainly login and logout, querying information, assessing teachers, etc. The personalized requirements are the visualization of the learning process, learning resources, and learning results. The specific student user requirements are shown in Figure 4.

(2) Analysis of the Functional Requirements of the Teacher Side. The standard functional requirements of the teacher side mainly include logging in to the platform, logging out of the platform, information inquiry, and grade management. The information inquiry function mainly includes class schedule inquiry, teaching tasks, teaching resources, and teaching progress. The grade management function mainly includes entering grades, correcting grades, and printing grades. Finally, the personalized requirements of the teacher users mainly include visual management of teaching resources, visual management of students' learning process, and visual management of students' learning results.

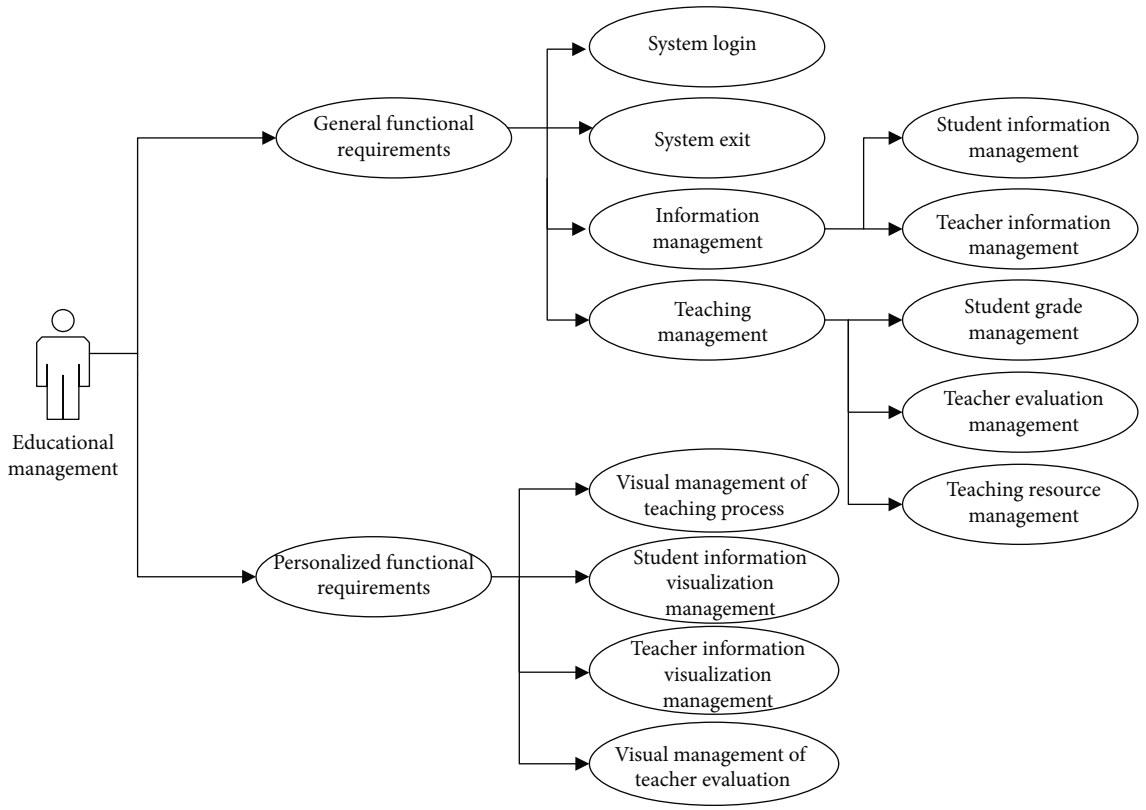

Figure 6: The use case of educational management use.

Table 1: User table.

Column name	Data type	Is empty	Main/foreign key	Remarks
LB	VAR(30)	Not null	No	User category(student\teacher\education management)
ZH	NUM(10)	Not null	Yes	Account (student ID\teacher ID)
MM	VAR(30)	Not null	No	Password
XM	VAR(20)	Not null	No	Name
LX	NUM(11)	Null	No	Mobile phone number
YX	VAR(30)	Null	No	Email

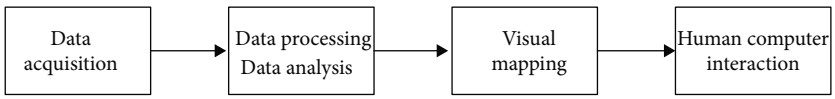

Figure 7: Data visualization process.

The specific user requirements are illustrated in Figure 5.

(3) Analysis Managers' Functional Requirements. The standard functional requirements of teaching managers are mainly logging in and out of the platform, managing students, managing teachers, managing grades, and managing teaching resources. The personalized requirements are visual management of the teaching process, visual management of teaching resources, visual management of teachers, and visual management of students.

The specific teaching management user requirements are illustrated in Figure 6.

3.2.2. Nonfunctional Requirements. The extraordinary demand for education information platforms based on big data visualization is mainly analyzed in terms of reliability and sharing of data, ease of use, and compatibility.

(1) Data Reliability and Sharing. Big data-based education information technology platform mainly collects, processes,

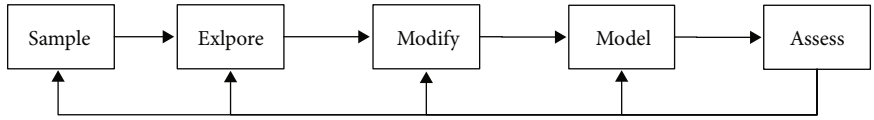

Figure 8: SEMMA model.

Figure 9: Teacher evaluation data visualization.

Figure 10: System login page.

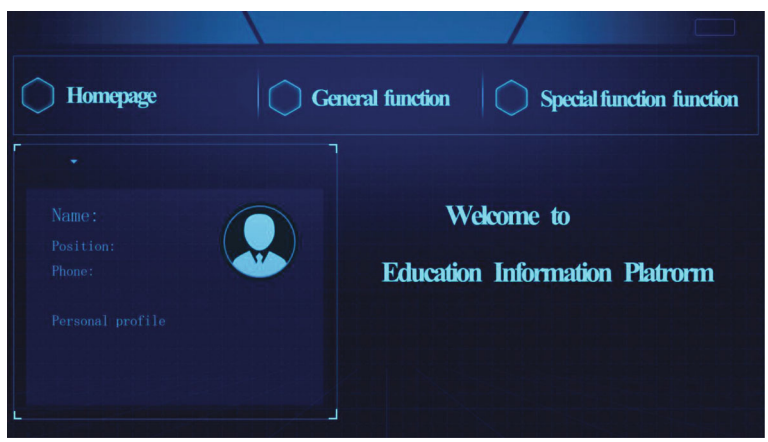

Figure 11: User personal homepage.

Table 2: Student user evaluation data.

	Satisfied	Commonly	Dissatisfied
General function	92	5	3
Personalized functional	96	3	1
System ease of use	93	5	2
System compatibility	95	2	3

Table 3: Teacher user evaluation data.

	Satisfied	Commonly	Dissatisfied
General function	93	3	4
Personalized functional	95	4	1
System ease of use	95	5	0
System compatibility	94	5	1

Table 4: Administrator user evaluation data.

	Satisfied	Commonly	Dissatisfied
General function	46	3	1
Personalized functional	48	2	0
System ease of use	45	2	3
System compatibility	45	3	2

and analyzes data for students, teachers, and administrators to carry out services. However, it is not easy to collect educational data in the educational process. It is very challenging to process the data because of its large volume, speed, variety, high value, and authenticity [27, 28]. Only by ensuring the reliability of the data can we ensure that the data used by users are valid. Therefore, the data on the education information platform is shared. However, the permissions of different user roles are different, and each role is individually configured to use the platform. The platform data are exchanged and processed through intelligence to ensure the sharing and independence of the platform information.

(2) Platform Compatibility and Ease of Use. Education information technology platforms should have the function of compatibility and ease of use. Compatibility is mainly reflected in hardware and software compatibility. Education information platform users can be different from operating platforms (Windows, Android, and iSO), different device terminals (PC, mobile (Personal Mobile Device (PMD)), and different browsers to access. The ease of use mainly reflects in the education users which need to have simple computer operation knowledge. They can apply the platform by themselves through simple training or watching operation explanation videos. To use the platform functions, users can log in to their personal homepage after registering information according to their roles through the platform prompts.

3.3. Platform Design. The education information technology platform for education big data visualization is a big data storage center. The data generated on the platform will be stored in the same database in a unified manner. In the big data storage center, all the stored data are in a shared state, but each subsystem generates data independently to add and delete subsystem data. The subsystems of the education informatization platform are the student management system, teacher management system, teaching management system, teaching resource system, and teaching administration system.

Although the big data storage center in the education informatization system based on big data visualization has individuality, it also has shared. The users of the informatization platform access the big data storage center through terminal devices, and the users of the platform include students, teachers, and administrators in three different roles, each with different levels of user rights, different types of data application needs, and other data access and retrieval from the big data storage center. Furthermore, the data in the center is called according to the user authority level. Therefore, by designing the user table of the education informatization platform to store user information and set the permission level according to the user type, the data in the user table include user category, account number, password, name, contact information, and email. The user table is shown in Table 1.

3.4. Python-Based Visualization Design for Educational Big Data. Visualization is the core part of this education information platform. The system is based on data mining and analysis of big educational data in Python. Eventually, it outputs a large amount of detailed and abstract data for users through visualization with more understandable graphics, helping users to view and apply data more intuitively and comprehensively and realize the value of data.

The essential data visualization process includes data collection, data processing and analysis, visualization mapping, and human-computer interaction (as shown in Figure 7).

Data collection is the basis for data visualization, and the quantity and quality of collected data will directly affect the visualization effect and the application value of the data. The data sources of the education information platform are mainly collected from existing systems, such as student registration management, academic affair management system, OA office system, and online learning platform. The data from the subsystems are called and stored through database technology to provide reliable, high-quality data sources for data processing and data analysis later.

Data processing and analysis are the prerequisite for data visualization. In this process, data preprocessing is required, and then, data mining is performed. Data preprocessing mainly uses data cleaning, integration, transformation, and statute. Data cleaning is mainly used to identify the noisy and irrelevant data in the original data, identify isolated points, and fill in the vacant values. Data integration integrates different data from the same system or multiple systems and stores them in the big data store. We solve the data redundancy, matching, and value conflict problems. Data transformation transforms the data stored in the big data store into a form suitable for data mining by

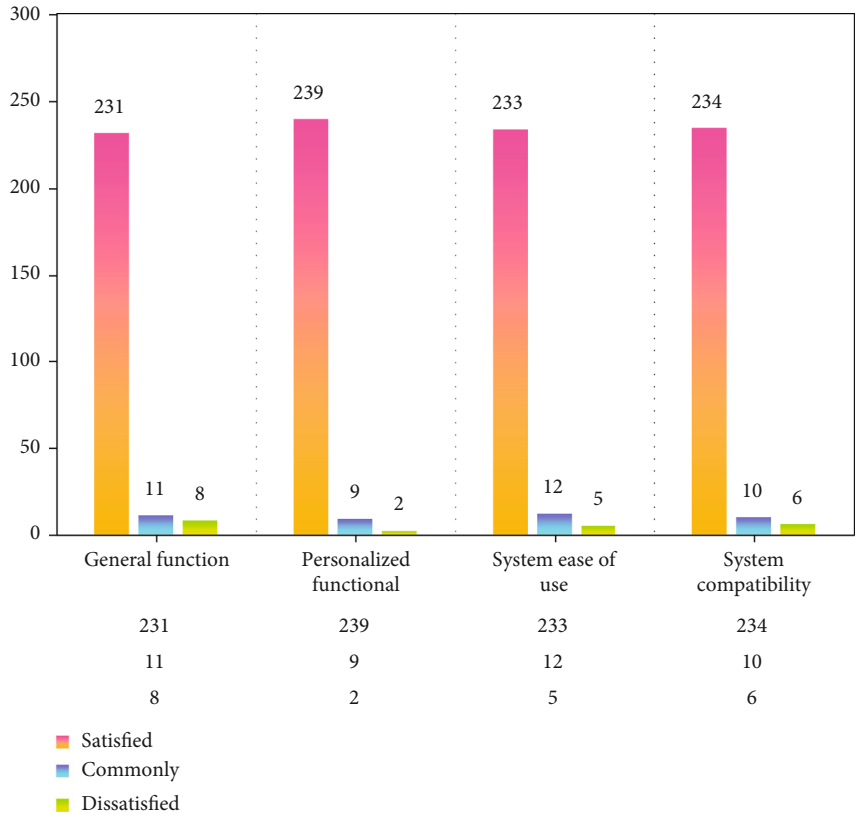

Figure 12: User experience survey results.

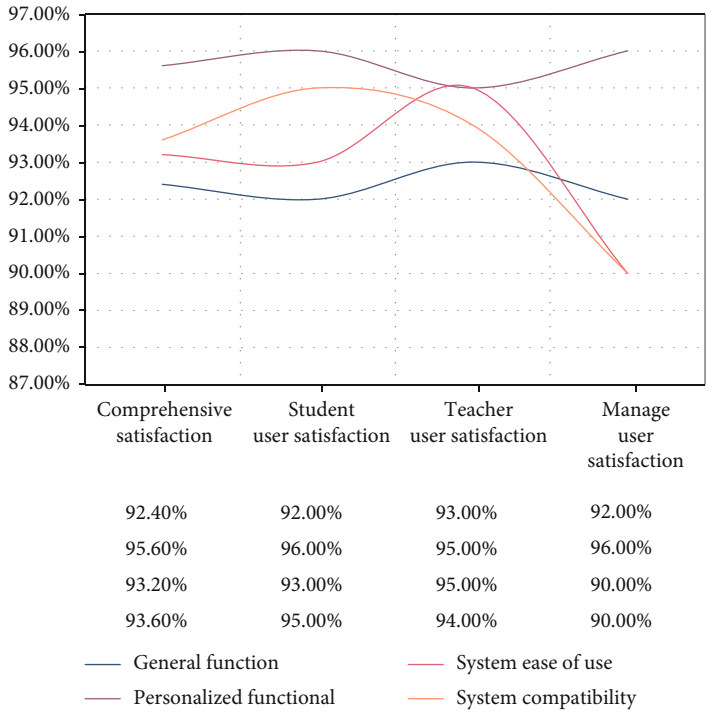

Figure 13: User satisfaction.

aggregation, generalization, normalization, and attribute construction operations on the data. Finally, data statute is mainly used to represent acquired educational big data. As a result, the scope of acquired educational big data is reduced and more able to meet the algorithm of Python data mining (as shown in Figure 8).

Visual mapping is the core of the educational big data visualization process, in which the information is mapped into visual elements after data preprocessing and data mining. The visualization mapping can increase the vividness and ease of using the data and make it more intuitive to observe and apply the data. The Python extension library matplotlib library is used for visualization mapping in the education information platform. matplotlib library depends on the extension library NumPy and the standard library Tkinter, which can draw a variety of graphics to meet the needs of the users of the education information platform.

Human-computer interaction is the ultimate goal of educational big data visualization. The purpose of educational big data visualization is to reflect the values, features, and patterns of data, present the information behind the data to users in a more intuitive and easy-to-understand way, and meet the different data needs of users (as shown in Figure 9).

4. Platform Testing and Analysis

4.1. Platform Testing. To build the test system according to the platform operation conditions and deploy the system to the database service. The main purpose of system testing is whether the education informatization platform based on education big data visualization meets the functional requirements and personalized needs of students, teachers, and administrators users and verifies system design's rationality. By specifying different user requirements, functional point testing is conducted to test whether each functional point can operate correctly.

Users of the education information platform access the information-based education management system through terminal devices, and the system login page is displayed first. The system login page of this platform is shown in Figure 6, and users log in by selecting the user type and entering the account number and password. The system does not have a user registration function, so the first time user uses the system, the user needs to log in with the administrator's account and password, and the user can change the password after successful login (as shown in Figure 10).

The system audits the user's login information, and only when the audit information is consistent can the user enter the homepage and use the system functions. Different personalized home pages can be developed for different types of user's individual needs. After the user's login information is successfully audited, the user can enter the personal homepage after successful login, as is shown in Figure 11. The user's personal homepage has both regular and personalized functions, and the user can choose to view relevant data according to his needs by using personalized functions, and the system presents the data to the user after visualization of the user's needs.

4.2. User Evaluation Analysis. In order to test whether the education information platform can better serve students, teachers, and teaching administrators, an in-depth survey was conducted through the application of the platform by the users. The education informatization platform was designed and developed for school A in Henan Province and is currently in the testing phase. Therefore, this survey was conducted by inviting users to try it out and then distributing questionnaires to trial users. The survey included the platform's usage in terms of regular functions, personalized functions, system ease of use, and compatibility.

The invited test user categories include three roles of platform users: students, teachers, and administrators. First, the largest number of users of the education information platform are students, then teachers, and finally administrators. Therefore, the invited users included 100 students and teachers and 50 administrators, and a questionnaire was sent to the test users at the end of the test. As the target of this questionnaire is to invite the test users, the offline questionnaire form is used to send the questionnaire; all 250 questionnaires distributed this time are collected, and there are no invalid questionnaires; the specific survey data are shown in Table 2.

4.3. User Evaluation Analysis. It can test whether the education informatization platform better serves students, teachers, and teaching administrators. By conducting an in-depth survey of users' platform applications, 250 users were selected to survey regular functions, personalized functions, ease of use, and system compatibility. Of the 250 users, 100 were in the student role, 100 in the teacher role, and 50 in the administrator role. The users accessed and experienced the platform functions through PC and mobile terminals, and the specific survey data are shown in Table 2. Table 3 shows the teacher user evaluation data, and Table 4 shows the administrator user evaluation data.

Through data analysis, we can get the following data:

(i) The satisfaction rate of the platform's regular functions is 92.4%

(ii) The satisfaction rate of personalized functions is 95.6%

(iii) The satisfaction rate of system ease of use is 93.2%

(iv) The satisfaction rate of system compatibility is 93.6%

The specific data analysis is shown in Figures 12 and 13.

5. Conclusion

This paper examines the design of an educational information platform for visualization of big educational data, analyzes the characteristics of big educational data, and discusses the development of related concepts in the field of educational big data visualization. The literature review presents the current design concepts of visual educational information platforms for Chinese elementary school students, teachers, and school administrators. It discusses the critical technologies of educational

big data visualization, architecture design process, platform overhang, and related technology introduction, thus presenting the current educational visualization's problems and critical technical challenges.

In order to make big data technology better serve teaching management, we analyze the education and teaching big data generated in the education process. We can provide visualization for users to help students optimize learning and personalized learning. We help teachers understand students' learning behaviors and learning results more comprehensively. According to their abilities, we optimize teaching content and improve teaching methods. Teaching managers can make scientific decisions from the big data generated in the education process. The education administrators can analyze the big data generated from the education process and make scientific decisions. In this paper, we designed an education information platform based on the visualization of education big data. We designed conventional and personalized functions according to the characteristics of users to meet the needs of platform users and better make the big data generated in the teaching process serve for teaching and management. The experimental results are as follows.

(1) This paper adopts the "LAMP" model for system development, and the platform has powerful compatibility and ease of use. Users do not need to download the client; users can access and use the platform through the PC or mobile browser

(2) In this paper, big data processing is designed, the platform is centered on data, and the data of all subfunctional systems are kept in the storage center. Furthermore, the system visualizes the data from the storage center to serve the users. As a result, the system has extreme scalability in terms of data sources that can access and develop subfunctional systems, and the user side can add personalized functions according to user needs

(3) Users are delighted with the platform designed in this paper, and their satisfaction with the platform's regular functions, personalized functions, system ease of use, and system compatibility all reach more than 90%, among which the highest satisfaction with the personalized functions of the platform reaches 95.6%. The platform designed in this paper can better help users use big data for education and teaching management

Currently, the design of China's educational big data visualization information platform is still in its infancy, facing more theoretical exploration and technical application challenges. The future educational visualization tool is by no means just a solution to the problem of presenting the last mile, but how to simplify the process, how to make users satisfied, and how to combine fast processing with responsiveness, promote the visualization information platform design as a tool for school management, and provide technical support to deeply understand the laws of education and solve complex educational problems.

Data Availability

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflicts of Interest

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

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