

Retraction

Retracted: Influence of Management Efficiency of Sports Equipment in Colleges and Universities Based on the Intelligent Optimization Method

Scientific Programming

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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] S. Wang, "Influence of Management Efficiency of Sports Equipment in Colleges and Universities Based on the Intelligent Optimization Method," *Scientific Programming*, vol. 2022, Article ID 7126743, 8 pages, 2022.

Research Article

Influence of Management Efficiency of Sports Equipment in Colleges and Universities Based on the Intelligent Optimization Method

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China has always considered the improvement of youth physical quality as one of the key steps in the talent training program, and universities have always followed the national policy to change the quantity and quality of sports equipment. This study mainly focuses on the development of sports equipment management system in colleges and universities. By building a scientific sports equipment management system, the efficiency of sports equipment management process is improved and the difficulty of managers' work is reduced. The construction of the sports equipment management system is a comprehensive information service platform created specifically for sports administrators. The main function is to help sports equipment administrators obtain information on equipment management, and it is an electronic system that can obtain the status of sports equipment use through certain instructions, providing an example for sports equipment management in China's universities.

1. Introduction

Along with the accelerated pace of economic development, the quality education advocated by the Ministry of Education in all colleges and universities has received wide attention from all walks of life, especially in the field of physical education, in order to quickly improve the quality of teaching. The equipment of hardware has increased significantly [1]. Then, about the use of this equipment, the construction of scientific and reasonable rules and regulations as well as the effective realization of the rational application of resources in teaching to achieve the improvement of quality must become the issue that needs to be considered at present. Today, with the increasingly rapid development in the field of information technology, it is possible to solve precisely the problems described above [2]. The use of information technology as a medium to achieve electronic system management of sports equipment can achieve efficient and convenient management [3].

As a part of fixed asset management, traditional sports equipment management is carried out manually, which

requires sports equipment managers to be on standby every day, making sports equipment management a headache that wastes both human and financial resources and is not favored. This problem is especially obvious in our unit [4].

First of all, as the size of the school continues to expand and develop, the sports equipment assets continue to expand and become more frequently used, and the number of sports equipment in the school is correspondingly much larger than the general number of schools and colleges, thus making it more difficult to manage. Furthermore, under the contradiction of one set of management system of two units, the school is divided into two parts in the management of fixed assets of sports equipment, College A and Branch B [5]. However, in the process of use, the two levels can use each other, which invariably increases the difficulty of sports equipment management and scheduling.

Secondly, there is no fixed position of sports equipment manager in our unit, it is done by physical education teachers on a part-time basis, and each physical education teacher has classes to attend and teaching tasks to complete. In response to the above phenomenon, at least two teachers

need to take turns to sit on duty to manage the assets and loan of physical education equipment, which increases the burden of teachers [6, 7].

Again, the use and management of physical education equipment in colleges and universities are characterized by many types, large quantities and decentralized departments, so it is impossible to take physical inventory regularly, which leads to the management of obsolescence; obsolescence and renewal of equipment often cannot be reflected and updated in time, which often causes discrepancies between accounts and reality and cannot objectively and truly reflect the status of assets [8].

Finally, the school has to fill out forms and apply and record the use of sports equipment in a detailed manner. These steps of approval and record-keeping consume the working time of the management staff and lead to the reduction of enthusiasm of students and related departments due to the complicated steps of loaning and returning equipment. Therefore, it is important to simplify the rental procedures and streamline the rental process [9].

The abovementioned reasons have brought a lot of trouble to the management of sports equipment in units. As the number and types of school sports equipment continue to increase, its utilization rate also gradually increases. In order to effectively manage school sports equipment, increase the purchase of sports equipment in a timely manner, keep track of the loan of sports equipment, and reflect the true information of fixed assets; it is imperative to develop an efficient sports equipment management system [10].

The purpose of developing and using a PE equipment management system is to free managers from the tedious manual registration work and to devote their energy to improving the efficiency of PE equipment management and facilitating the use of PE equipment, thus making PE equipment management more efficient and convenient and better serving the overall school teaching [11].

2. Overall Design of Sports Equipment Management System in High School

The development of the sports equipment management system in colleges and universities is conducive to the expansion of new ideas in the management of sports equipment in colleges and universities. Administrators can make real-time inquiries about sports equipment borrowing and returning information within the system, supervise students who have not returned their equipment after the deadline, and set up compensation and other management operations through the sports equipment management system. With the assistance of the sports equipment management system, the sports management department can have the remaining time to perform other tasks in their positions. The construction of a sports equipment management system in higher education provides a good working atmosphere and an efficient form of work for the sports equipment management department [12].

Management information system (hereinafter referred to as MIS) must be human-centered in the process of realization; of course, hardware and network equipment and computer software are essential, mainly for the specific

transfer, processing, collection, and processing of information on the target to be able to ensure the efficiency of management [13]. Management information systems are very different from other systems mainly because this system is mostly focused on the analysis of operations. While in specific academic studies, systems of decision automation and decision support are the collective term for information management methods (e.g., decision support systems, expert systems, and supervisory support systems) [13].

The functions of management information systems are very numerous and are inextricably related to each other, as well as to the combined situation of an organism dedicated to the realization of the overall functionality. The specific functions are described below: data processing, that is, the processing of data for storage, collection, transmission, processing, and input and other processes transaction processing, mainly focused on the assistance of the content of the work of managers, who, with the relevant research, are well able to free themselves from the mental and physical labor of the past, greatly improving the efficiency of work and increasing the creativity of the staff [14]. The forecasting function, which can analyze the future situation by means of data formulas and realistic simulations, enables rational planning; the planning function can plan the work of the department in advance and control the final execution by means of relevant monitoring systems; the control function, which can control the management and analyze the causes of loopholes, plays a role in supporting the staff. The auxiliary decision-making function can improve the scientific nature of decision-making, especially in terms of the accuracy of mathematical models.

Management information system (MIS) is a type of information that uses computer terminals and network communication devices, businesses, schools, and government departments, such as collecting, transmitting, sharing and maintaining a specific range of information, and interacting with relevant system operators [15]. Management information systems in order to the ultimate goal to improve management efficiency and thus improve the market competitiveness of enterprises. The project is shown in Figure 1.

The integrated management information system consists of six parts, which are mainly collected, processed, stored, transmitted, maintained, and used [16]. A well-developed management information system allows the user to first specify exactly what information is needed, to purposefully collect relevant information and convert it into a format that accepts the user on this basis, in addition to information management.

The process of carrying out the development of the system should pay great attention to the workflow, and it is necessary to achieve precise transformation in the specific workflow so that it is possible to constantly innovate the management mechanism, which is significant in terms of establishing reasonable rules and regulations, as well as stable production procedures, and constantly broadening the management practices in management, promoting the upgrading of the management system, and greatly simplifying the workflow, and in terms of improving the efficiency of work, the significance is significant [17].

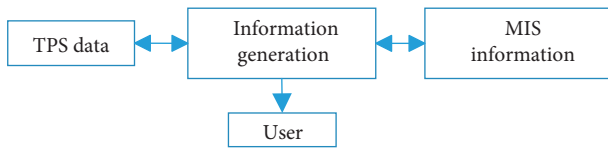


FIGURE 1: Working principle diagram.

The development of the management information system must pay attention to the requirements and make a fairly detailed analysis of the requirements in order to be able to achieve the target. From the beginning, it is important to have a big picture view, to be able to face the management object from a certain level, to be able to analyze the main issues and details, and to follow the top-down principle. At the development level, it should be compatible and adaptable to the later development and maintenance of the system. The code should be readable, modular, and pluggable and have the ability to adapt to changes in requirements as they occur. Training documents and trainers are available during the application phase. Users are enabled to have some knowledge of the benefits of the system and to manage it, so that the use of the system can be promoted smoothly [18].

3. Sports Equipment Management

3.1. School Sports Equipment. School sports equipment refers to school sports training, various equipment, sports equipment and teaching materials, sports competitions, and extracurricular sports activities and uses. It is a task to complete school sports and to achieve the basic premise and material basis, the purpose of school sports. Physical education supervision is an important part of the development of school physical education, and it measures the standardization of school physical education.

3.1.1. According to the Classification of Sports Items. After the classification of sports, it is also possible to achieve the classification of equipment, such as track and field track and field equipment, weightlifting equipment, and ice and snow equipment.

3.1.2. Classification according to the Nature of Sports Equipment. The current classification is mainly based on four categories: self-provided equipment, designated equipment, field equipment, and other equipment.

When the two sides of the competition often specify the manufacturers, trademarks, and specifications of the equipment, which is a good way to avoid conflicts, self-provided equipment is the equipment carried by the athletes themselves, for example, some sports are brought by themselves, such as ball bats, sports clothing and related shoes, hats, and protective gear and some are items in the venue, such as goals, stoppers, and timers. Of course, there are some nonfield information, mainly including physical training, fitness activities, and sports and recreation equipment.

3.2. The Concept of Sports Equipment Management. In "Management," that is, the specific management process, there are many interpretations of the concept of management, and the following definition is made by summarizing the conceptual theories of most scholars: the manager is the subject of management, mainly based on the understanding of the objective laws of the accident, using a rational approach and an orderly, rational, and scientific analysis of the relevant processes, which may contain a lot of planning and control in the process. The main purpose is to regulate the flow of activities and the integration of resources so as to achieve the target process [9, 10].

Based on the understanding of the concept of management, the definitive conclusion about the management of physical education equipment is made in this study: the school should take into account the condition of the equipment itself and adopt reasonable means and procedures in conducting the use of physical education equipment. The methods are controlled so that the sports equipment can play its proper role and can achieve the coordination of all aspects, which is significant for the use of sports equipment.

4. Design of Sports Equipment Management System in High School

4.1. Overall System Design. Layered architectures are very common in software architecture planning, and they are also a very important class of constructs. A hierarchical model can often have three main layers, roughly from bottom to top: the domain layer, the data access layer, and the representation layer [6], as shown in Figure 2.

The role of each level is as follows.

The access data layer is mainly a class of operations on the initial numbers (database or a series of files and other types of storage of numbers), but not the initial class of data alone. We can also say that it is related to the operation of the numbers, specifically the transaction logic layer or the related services provided on behalf of the class.

The logical layer of the transaction: it is mainly for the operation of the problem, which can also be understood as the operation of the data and the logical processing of the data transaction. If the building blocks are the data layer, then the building blocks are the logical layer.

Representation layer: the main representation WEB way can also be expressed as WINFORM way. WEB way can also be expressed as aspx; if the logic layer is quite powerful and perfect, no matter how the performance layer is defined and changed, the logic layer can be perfect to provide services.

This system administrator C/S structure to achieve the overall architecture design is shown in Figure 3.

The technical route of system development adopts J2EE development technology and follows J2EE1.4 specification.

C/S structure part of the implementation of the interface representation layer using java application swing components to achieve GUI graphical user interface and to achieve database connection using JDBC-ODBC bridge.

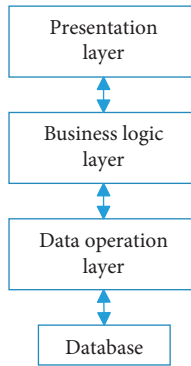


FIGURE 2: C/S three-tier architecture diagram.

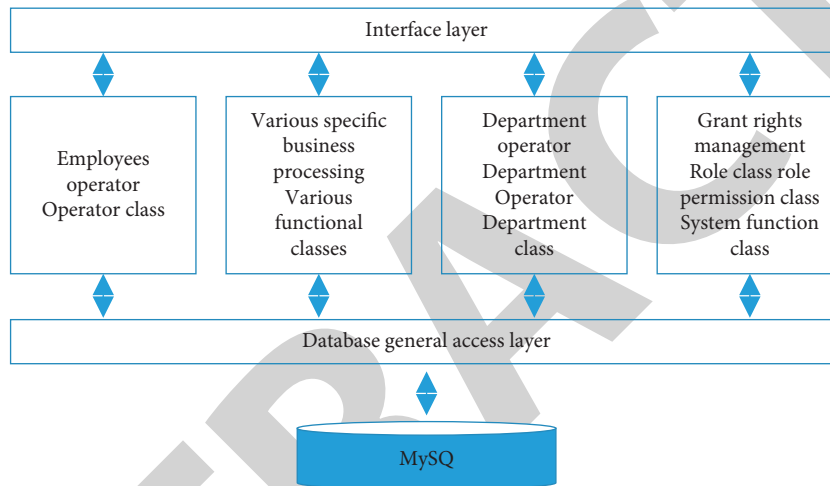


FIGURE 3: C/S implementation three-tier architecture diagram.

4.2. System Functional Module Design. In accordance with the top-down, step-by-step approach, the top-level modules are designed to design their subordinate modules for each module. The structure diagram of several important modules is shown in Figure 4:

As seen in Figure 5, loan registration is the top-level module and borrower information and device information are its subordinate modules, while borrower number and borrowing time are the subordinate modules of borrower, and device level, quantity, and device name are the subordinate modules of device information.

In Figure 6 of the structure of the “return device” module, the return registration is the top module for the borrower information and the device information; the borrower information is also the top module for the borrower number and the return time, and the device information is the top module for selecting the returned device.

In Figure 7 of the ‘request device’ module structure, the request registration is the top-level module and its subordinate modules are borrower information, submission time, and device information. The borrower information is the top module for the borrower number and the borrowing time; the device information is the top module for the quantity and the selected device name.

In the structure diagram of the “approval application” module, the approval result is the top-level module for approval, the approval is the top-level module for viewing the application record, and the viewing application record is the top-level module for borrower information and equipment information.

The software design of the university sports equipment management system is mainly divided into three layers: information display layer, business processing layer, and data storage layer [3].

The information display layer is the interaction interface between the equipment management system and the user, and its main function is to display the information of equipment borrowing and returning. For example, if a device borrower forgets the login password when logging into the device management system, he/she can log in or reset the password in the form of a dynamic verification code to ensure the security of the system.

The business processing layer can play a role between the information display layer as well as the data storage layer. When sports equipment borrowers and returners initiate business processing or inquiries in the information display layer, the processing results can be retrieved to the processing center of the data to retrieve the user’s information,

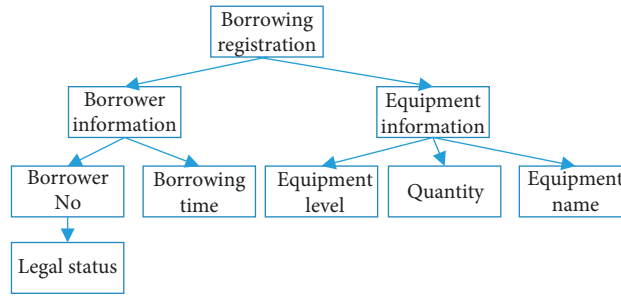


FIGURE 4: Structure of the “loaner” module.

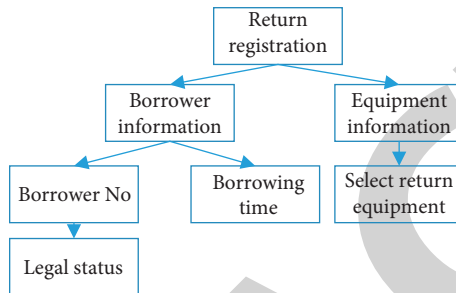


FIGURE 5: Structure of the “return of equipment” module.

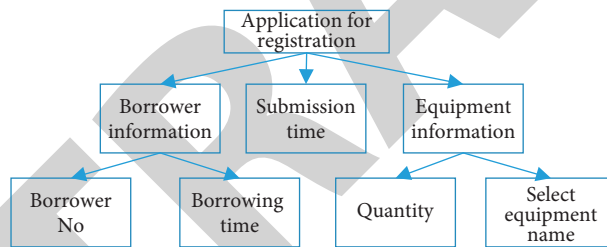


FIGURE 6: Structure of the “request device” module.

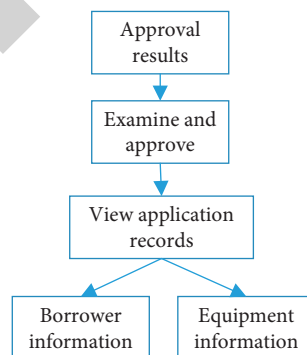


FIGURE 7: Structure of “approval application” module.

and the results can be fed back to the representation layer. When designing the core business processing layer that is in the whole software system, the rules and regulations and system application processes developed in the early stage should be placed in this layer to avoid code errors in the application process of the sports equipment management system. When certain sudden code errors appear, the business processing layer will provide timely feedback to the

information display layer. When designing the business processing layer, attention needs to be focused on the problem of anomalous phenomena and the system crash caused by network virus problems.

The data storage layer is mainly responsible for changing the data storage content and the output method of the data, and the data can be retrieved, passed, and deleted in the college sports equipment management system. After the original data

are basically determined in the early stage of system data setting, the original data will not be changed in the later stage. In order to improve the sense of the later use of the whole equipment management system, this study provides a more convenient data storage layer operation method for the third layer system.

5. Database Design of Sports Equipment Management System in Colleges and Universities

5.1. Sports Equipment Management System Design Process. Database design can be arranged into five main stages: user requirements analysis, system conceptual design, data structure design, software design, and post-operation and maintenance. In the preliminary stage of database development, the user requirements and system conceptual design are the most important.

5.2. Conceptual Structure Design of Sports Equipment Management System. E-R diagram, proposed by P.P. Schen in 1976, is one of the effective methods of initial conceptual analysis of database modules of sports equipment management systems [5]. In the sports equipment management system of universities, the main design idea should be followed to build a relational model system that reflects the real phenomenon. In the corresponding sports equipment management system, the relationship between individual entities is closer, and it can be seen that when designing the core terminal of the system, it is necessary to take into account the problem of data attributes and realize real-time query, modification, and deletion operations between subjects.

5.3. Sports Equipment Management System Process Structure Design. In the data storage system of college sports equipment management system, teachers need to be granted the authority to manage the system firstly, which can be mainly divided into the following categories: system management teachers, sports equipment management teachers, and teachers in charge of sports equipment management. Mainly through the system management teacher for permission allocation work, the teacher table is the main data source for system login and equipment check-in/check-out.

When a class needs to borrow sports equipment, they need to present their student ID card to the sports equipment manager and check their personal information against the class form to complete the loan.

In the college sports equipment management system, the class and teacher's class schedule is stored, and when a class needs to borrow sports equipment, this form can be used to verify the information. The management of the schedule is a little more complicated, as the schedule needs to be updated every semester according to the teaching schedule, so the system administrator needs to make real-time changes to the schedule.

In the PE equipment management system of the university, teachers need to apply for the loan of PE equipment according to the regulations issued by the PE equipment

room. It is important to note that, in order to regulate the equipment borrowing behavior of teachers, the number of sports equipment that can be borrowed at a time should be specified. For example, teachers may only borrow three types of physical education equipment at a time and students may borrow one type of physical education equipment at a time. When the borrower returns the equipment after use, the administrator then modifies and records the corresponding fields in this table. The details are shown in Figure 8.

When teachers or students return sports equipment, the system automatically updates the data in real time and analyzes the loan record table together with this table. When the system makes a regular inquiry for the users who have not yet returned the sports equipment, if the teacher or student is found to be the one who returned the sports equipment, the system will automatically remind the teachers and students who have not yet returned the sports equipment to try to return it at once. The details are shown in Figure 9.

6. Performance Test

According to the communication and research with other colleges and universities, some specialized sports colleges and universities, such as Tianjin Sports Institute, have just developed their own sports equipment management information system. Although the sports equipment management system developed by each university is only successfully developed and put into use in these two years, the history is not too long, but it shows that this issue has already attracted the attention of each university on fixed assets' management in sports equipment management. These sports equipment management systems developed by colleges and universities are mainly used for a number of purposes, approving the borrowing of the equipment concerned, statistical management of the total classification, reporting and updating, etc., which basically solve the basic functions required by most colleges and universities in need of such systems, as shown in Figure 10.

However, the sports equipment management system developed by these sister schools and colleges cannot fully meet the needs of sports equipment recall and management under the unique system of "two levels of schools and colleges with one set of management mechanism" in the light of the actual management situation of the school. Different equipment management systems focus on different functional points, and this system is mainly intended to solve the borrowing and returning of sports equipment for two levels of schools, including College A and Branch B. There are major differences between the management process and ideas of sports equipment and other equipment management systems, for example, in the number of returns and the time nodes of returns, as shown in Figure 11.

The difference in categories leads to differences in borrowing and lending. For sports equipment, borrowers are usually teachers, and at some point in time, the number of one-time borrowing and returning is larger. From the security point of view, other systems, especially those involving the military, generally have more security and confidentiality design to consider, while the sports equipment management system is a civilian, relatively less in terms of security.

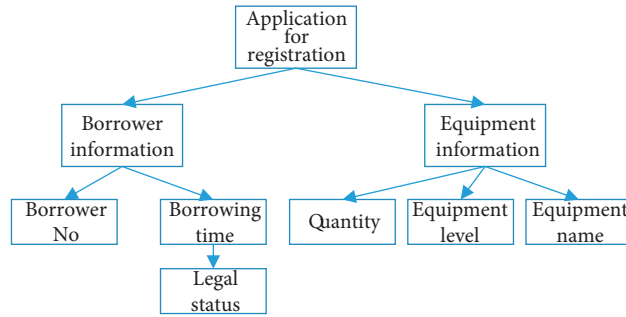


FIGURE 8: Structure of the loaner device module.

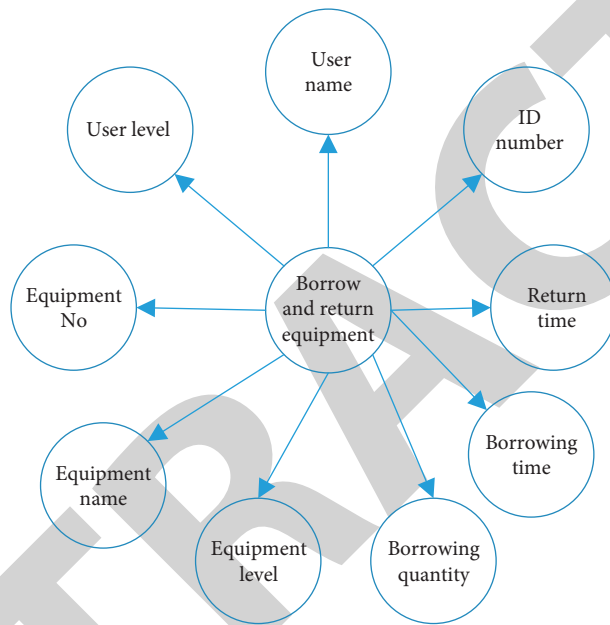


FIGURE 9: Property diagram of the loan and return information entity.

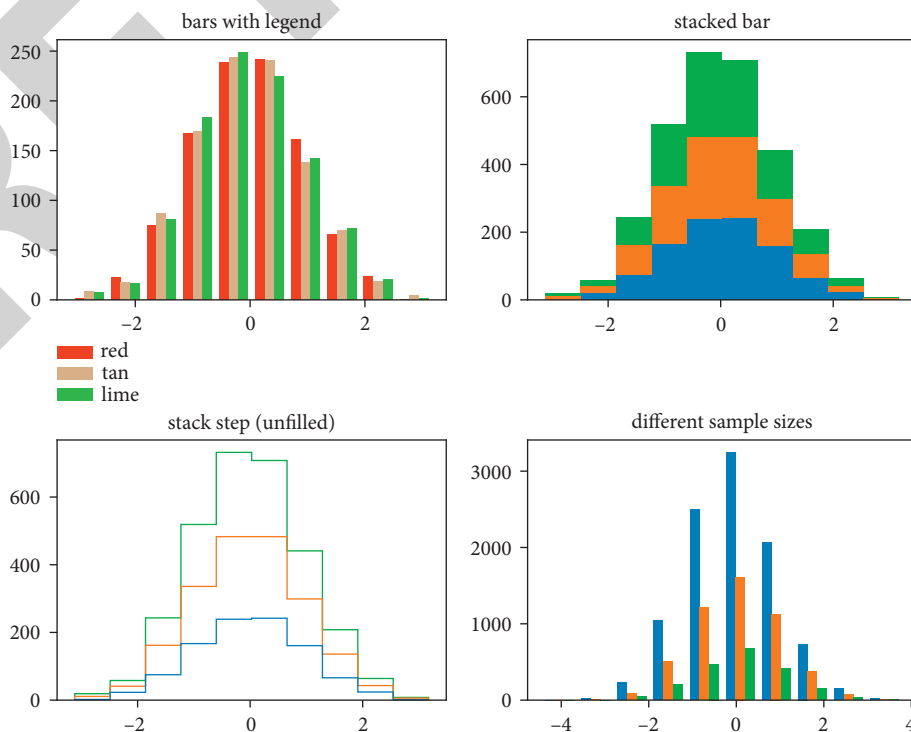


FIGURE 10: Different management effects.

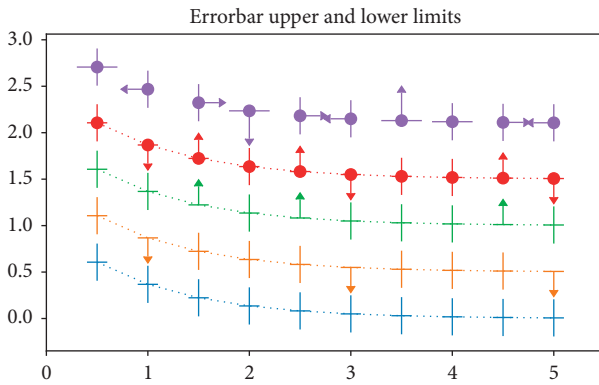


FIGURE 11: Management effect of different devices.

7. Conclusion

This study presents a detailed software design analysis of the construction of a sports equipment management system for colleges and universities and briefly describes the process structure design in the system. It provides a safer and more efficient sports equipment loan and return system for university teachers and students to realize the construction and management of digital campus. The development of this sports equipment management system plays an important role in improving equipment utilization and realizing autonomous management.

Data Availability

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

Conflicts of Interest

The author declares no conflicts of interest regarding this work.

Acknowledgments

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