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DOCUMENT MANAGEMENT SYSTEM

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ABSTRACT

Document management system is a network application specially developed for Guangdong Vocational College of Innovation and Technology in Guangdong Province, China. It is an effective tool for school document management and office management. The system allows for quick and easy management of school documents, meetings, notifications, giving them traceability. In addition, the document management system uses the system to integrate the functions of school personnel management as well as other management functions, including teacher check-in, financial reimbursement, leave and so on. Through the document management system, the school can speed up the work efficiency, improve the process and handling of internal documents, and reduce unnecessary waiting time. At the same time, the problems of uploading and issuing school documents, various notices, teacher sign-in and so on were solved. The file management system proposed by the school met the ISO software quality standards to a large extent, especially in terms of function, reliability, availability, efficiency, maintainability and portability. In order to improve the effectiveness of the system, the system was developed according to the needs of the school as well as the opinions of relevant IT experts: The use of the cache: the cache can store frequently accessed data, thereby reducing the number of visits to databases or other data sources. Use indexes: Indexes can speed up access to databases or other data sources. Use a CDN: A CDN can cache the content of an application closer to the user, reducing latency. Scheduling technique. Considering the results of this study, Guangdong Vocational College of Innovation and Technology needs a fine-tuned system to manage the school's various documents. The system integrates the information management, online office, paperless office, and file management of the school. It also aims to help the school administrators to make more effective school management and make accurate choices for school development by providing comprehensive data statistics and analysis capabilities.

Keywords: *ISO standard, document management, online office, information management*

INTRODUCTION

With the continuous promotion, popularization, and vigorous development of e-government and e-commerce in China, the number of electronic documents is steadily increasing. These electronic documents serve as indispensable tools and authentic records for e-government and business activities. However, ensuring the scientific management of electronic documents is crucial to avoid substantial losses resulting from improper handling. Thus, there is an urgent need to strengthen

both theoretical research and practical approaches to electronic document management (Han et al., 2020).

Gao (2018) discussed in his article that technological systems are cost-effective and do not compromise on the quality of service provided. Over the years, there have been significant struggles in properly maintaining patients' records. Therefore, the introduction of systems for managing patient information enables healthcare professionals to track patients' health concerns and treatment over time. This, in turn, provides patients with a better understanding of their diagnosis and treatment options, ultimately enhancing service delivery.

Document management, often referred to as document management systems (DMS), involves the use of computer systems and software to store, manage, and track electronic documents as well as electronic images of paper-based information captured with a document scanner. It constitutes how an organization stores, manages, and tracks its electronic documents. Agile methodology was employed in this instance, which is typically applied for short-term development processes (Association for Intelligent Information Management, 2023).

According to ISO 12651-2, a document is defined as "recorded information or object which can be treated as a unit." While this may sound complex, it essentially encompasses what individuals have been creating, distributing, and using for years.

Document management represents one of the precursor technologies to content management. Not too long ago, it was available solely as a standalone system, similar to imaging, workflow, and archiving systems. It offers fundamental functionality to content management by imposing controls and management capabilities onto otherwise "dumb" documents.

Although a paper-based records system provides accountability, it comes with inherent challenges such as difficulty of access, time-consuming updates, lack of security, and inability to swiftly share between different locations or maintain for an extended period without risk of destruction (Amaechi et al., 2018).

With the rapid development of the network, the study, work, and daily lives have become inseparable from it. The network significantly simplifies and enhances efficiency in people's lives and work. Introducing computer network technology into office management transforms the traditional manual office model, enabling information statistics summary, file sharing, resource sharing, and collaborative work on campus. This integration not only improves work efficiency but also reduces unnecessary expenses and enhances the soft power of colleges and universities.

Simultaneously, according to the Code for University Informatization Construction issued by the Ministry of Education (2021), China is implementing an information-based campus policy, leading to a proliferation of equipment types on campuses. Consequently, the maintenance of this equipment has emerged as a significant challenge.

Located in Dongguan City, Guangdong Province, Guangdong Innovative Technical College is a full-time general higher vocational college approved by the People's Government of Guangdong Province, registered by the Ministry of Education, and supervised by the Department of Education of Guangdong Province. Established in 2011, the school underwent talent training evaluation for higher vocational colleges organized by the Ministry of Education in 2018. By December 2022, the school spanned an area of 1.0597 million square meters, boasting a total building area of 410,000 square meters, teaching instruments and equipment valued at 92.6733 million yuan, and a library collection of 1.558 million volumes. With 8 secondary colleges offering 60 majors, it employs 860 full-time teachers and educates over 15,000 full-time students. The implementation of an online file management system is bound to reshape the university's reform strategy as it continues to evolve.

Guangdong Vocational College of Innovation and Technology faces several challenges in its daily management and operations. Firstly, school files are dispersed across different locations, making organization and retrieval cumbersome, often resulting in wasted time and effort searching for specific documents. Moreover, this disorganization increases the risk of file loss, potentially leading to critical documents being misplaced or irretrievable. Without a proper document management system, the school's workflow is disrupted, diverting teachers and staff from teaching and other essential duties to deal with paperwork.

Furthermore, the absence of a document management system exposes the school's files to security threats, including unauthorized access, tampering, or disclosure of sensitive information, jeopardizing the privacy of both the school and its students. Additionally, the lack of collaboration and file-sharing capabilities among teachers and staff hampers overall efficiency.

Therefore, establishing an effective Document Management System is imperative for the smooth operation and management of the school. Moreover, with the continuous enhancement of hardware and software infrastructure in universities, coupled with the expansion of enrollment and increasing office tasks, the traditional working methods in colleges and universities are insufficient to meet the growing demands.

Given these challenges, the researcher proposes a study on implementing a Document Management System at Guangdong Vocational College of Innovation and Technology. Such a system would accelerate the school's workflow, streamline internal document processes, and diminish unnecessary waiting times, ultimately enhancing operational efficiency.

Statement of the Problem

This study aimed to design and to develop a school documents management system to help the schoolwork office of Guangdong Vocational College of Innovation and Technology to improve the school document management and processes, and to provide timely, efficient and accurate data and services for all administrators, teachers and staff.

More specifically, the study aimed to answer the following problems:

1. What are the problems and challenges encountered by the Administrative Office, School Experimental

2. What system can be developed to address the problems, and challenges?

3. What is the extent of compliance of developed system to the standards of ISO/IEC 25010 Systems and software Quality Requirements and Evaluation (SQuaRE) in terms of:

3.1 Function Suitability;
3.2 Performance Efficiency;
3.3 Compatibility;
3.4 Usability;
3.5 Reliability;
3.6 Security;
3.7 Maintainability;
3.8 Portability;

4. What enhancement can be done to improve the developed system?

METHODOLOGY

This chapter introduces the many tools that were used in this study. This presents the research design, participants of the study, instrumentation, data gathering procedures, and data analysis.

Research Design

This study utilized a descriptive and developmental research approach.

For the descriptive research design, a qualitative method was used to determine the problems and challenges encountered in the existing processes while the quantitative method was used to evaluate the developed system with the ISO 25010 Software Quality Standards.

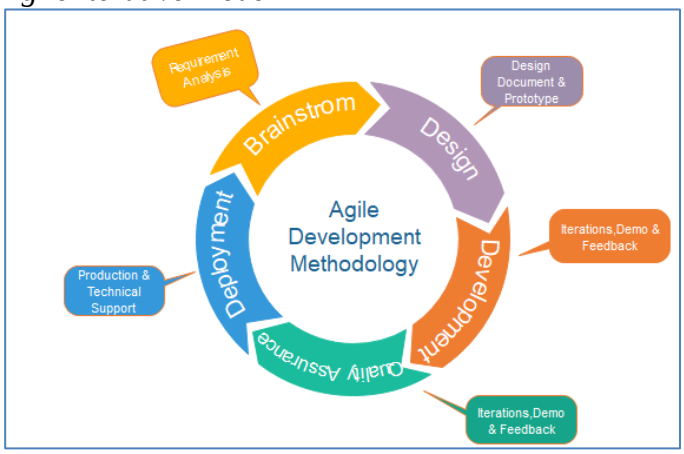
For the developmental research design, the Agile Iterative Methodology was utilized for the development of the system.

Agile methods involve breaking tasks into smaller iterations, devoid of direct involvement in long-term planning. The project scope and requirements are established at the onset of the development process, with clear plans delineating the number of iterations, their duration, and scope.

Each iteration, constituting a short time "frame" within the Agile process model, typically spans from one to four weeks. This division of the entire project into smaller parts serves to minimize project risk and reduce overall project delivery time requirements.

Throughout each iteration, a team undergoes the full software development life cycle, encompassing planning, requirements analysis, design, coding, and testing. This comprehensive approach ensures that a working product is demonstrated to the client at the conclusion of each iteration (JavaTpoint, 2021).

Agile Iterative Model



Following are the phases in the Agile model are as follows:

Requirements gathering. During this phase, the researcher defined the project requirements, elucidating business opportunities, and outlining the time and effort necessary for project development to the client. Subsequently, the researcher evaluated the technical and economic feasibility based on this information.

Design the requirements. When the researcher identified the project, collaborated with stakeholders during this phase to define requirements. Utilizing the user flow diagram or high-level UML diagram, the researcher illustrated the functionality of new features and demonstrated their integration with the existing system.

Construction/ iteration. When the team defined the requirements, the work began. As the designer and developer of the project, the researcher commenced working on the project, aiming to deploy a working product. The product underwent various stages of improvement, incorporating simple, minimal functionality.

Testing/ Quality assurance. In this phase, the Quality Assurance team examined the product's performance and looked for bugs.

Figure 3.

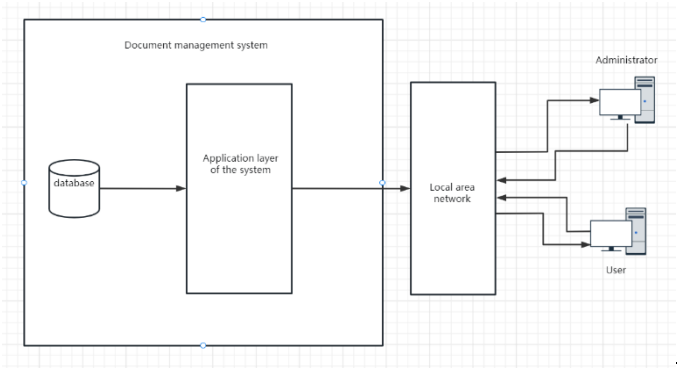
Deployment. In this phase, the Quality Assurance team assessed the product's performance and searched for any bugs.

Feedback. After releasing the product, the last step was feedback. During this phase, the team received feedback about the product and worked through it.

Table 1 presents the minimum and recommended hardware and software requirements for the development and implementation of the system.

Table 1.
Hardware and Software Requirements

Minimum Hardware Requirements	Minimum Software Requirements
• At least 16GAM or higher • 3.0 GHz processor , at least dual core or higher • 1024*768 monitor-screen resolution or higher • At least 200G or higher of hard drive capacity • At least 2GB VRAM	• MySQL database • JavaScript • Maven 3.9.2 • Jdk1.8.0
Recommended Hardware • At least 32GAM or higher • 2.5 GHz processor , 16 cores 1024*768 monitor-screen resolution or higher • At least 2T of hard drive capacity • At least 3GB VRAM	Recommended Hardware • MySQL database • JavaScript • Maven 3.9.2 • Jdk1.8.0



Architectural Design

Figure 4.
System Architecture

Figure 4 illustrates the system architecture of the developed Document Management System (DMS), utilizing the Browser/Server (B/S) model. This architecture relies on the interaction between browsers and servers. Users engage with applications via web browsers, while the server manages core functions and data processing.

In the DMS, the B/S architecture facilitates seamless document management and collaboration with several defining features:

Front-end Browser Interface. Within the B/S framework, users access the DMS via a standard web

browser. This accessibility enables users to utilize the system across various devices, including PCs, laptops, and mobile devices, without the necessity of installing additional client software.

Server-side Processing. The server side is responsible for managing the core functions and data processing logic of the DMS. This encompasses tasks such as document storage, indexing, permission management, and version control. These modules handle user requests, execute corresponding operations, and furnish appropriate responses and data.

Network Communication. Embracing the B/S architecture, communication between the front and back ends occurs over the network. User requests initiated in the browser are transmitted to the server via the network. The server then processes these requests and transmits the results back to the browser for user display.

Flexible Access Control. Through the B/S architecture, the DMS implements adaptable access control measures. The server can assign varying permissions to different users or user groups based on their identities and roles, ensuring document security and confidentiality.

Cross-platform Compatibility and Extensibility. Leveraging the standard web browser foundation, the B/S architecture offers cross-platform compatibility. Whether users operate on Windows, Mac, or Linux systems, they can access the system seamlessly through a browser, enhancing overall system extensibility.

Use Case Diagram

Figure 5.
Use case diagram for Admin.

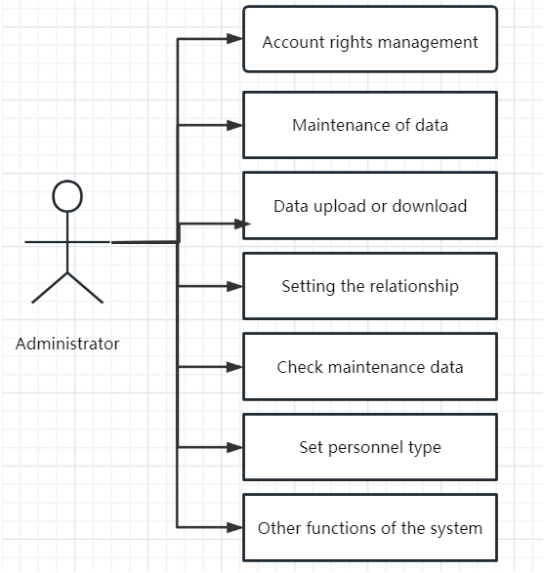
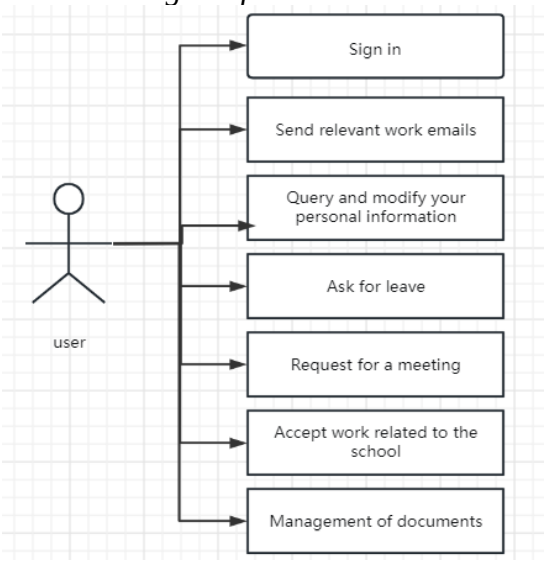


Figure 6.
Use case diagram for Users.



Participants of the Study

The study involved school leaders, teachers, and staff from Guangdong Vocational College of Innovation and Technology as participants.

Table 2.
Participants of the Study

Participants	Frequency	Percentage
School Heads/leaders	20	23.00
Teachers and Staff	50	56.00

Laboratory Technicians	10	11.00
IT Experts	10	10.00
Total	90	100.00

Instrumentation

The researcher employed suitable instruments for data gathering, data interpretation, and the preliminary design of the system for the study. Specifically, interviews and questionnaires were utilized.

Interview Guide. The researcher conducted interviews with teachers and staff regarding the problems and challenges associated with various document transactions and processes.

ISO 25010 Software Quality Standardized Questionnaire. The researcher used this tool to determine the extent of compliance of the developed system with the ISO 25010 software quality standards.

Data Gathering Procedure

In order to collect relevant documents and data for the study, the researcher performed the following procedures:

1. The researcher obtained clearance from the Ethics Review Committee of St. Paul University Philippines to ensure the ethical soundness of the research.

2. The researcher sought endorsement from the thesis adviser and the Dean of the Graduate School for data gathering.

3. The researcher requested permission from the school head to conduct an interview with the teachers and students at Cangzhou Preschool Teachers College.

4. Before the data collection, the validity of the data tools was established and identified, and identification of the study participants was taken into consideration.

5. Prior to data collection, the technologies used to gather the data were validated and identified, and steps were made to identify the study participants.

6. Informed consent/assent from the participants was sought to ensure that the study conformed with the ethical norms of research.

7. Upon the approval of the head school head of the Cangzhou Preschool Teachers College, the researcher conferred to the school on the details of the gathering.

8. To complement the insights gained from the series of participant interviews, direct observations were conducted. The researcher personally attended to witness the repair processes, their completion, and observe how employees saved and retrieved their data as required.

9. Moreover, IT experts utilized a standardized questionnaire based on the ISO/IEC 25010 software quality standards to evaluate the extent of compliance of the developed system with these standards.

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Data Analysis

The data obtained by the researcher were tallied and organized for analysis and interpretation.

Thematic Analysis. This was used to analyze the problems/challenges encountered by the participants in the existing system.

Mean. This was used to determine the extent of compliance of the developed system with the ISO 25010 software quality standards.

Table 3.

Four-Point Likert Scale Used to Determine the Developed System's Extent of Compliance with the ISO/IEC 25010 Software Quality Standards

Scale	Mean Range	Descriptive Interpretation
5	4.20 - 5.00	Very Great Extent
4	3.40 - 4.19	Great Extent
3	2.60 - 3.39	Moderate Extent
2	1.80 - 2.59	Low Extent
1	1.00 - 1.79	Very Low Extent

RESULTS AND DISCUSSION

This chapter presents the results of the data analysis and subsequently organizes discussions in alignment with the problem statement. Furthermore, it incorporates the evaluation of the developed system by IT experts utilizing the ISO/IEC 25010 Software Quality Standards.

Problems and Challenges

Through interviews and observational analysis, several major problems and challenges were identified, including:

Difficulty in Promptly Locating Necessary Files

The absence of effective document and information management, marked by issues such as file loss, confusion, and delayed updates, poses significant challenges. Faculty and staff struggle to find convenient methods for storing, retrieving, and sharing files, increasing the risk of data loss and hindering timely information dissemination. Consequently, this impacts the operational efficiency of the school.

Difficulty in Communication and Collaboration

Teams encounter difficulties when collaborating on tasks, which can result in delays in both teaching and administrative work. Moreover, approval processes tend to become burdensome and time-consuming, thereby hampering overall work efficiency. These challenges extend to remote or decentralized teams, exacerbating communication issues and further impeding timely collaboration.

Absence of an Online Document Management System

Achieving remote work and collaboration poses increasing challenges, especially concerning accessing and sharing files. These obstacles have the potential to impede flexible work arrangements and diminish the efficiency of remote team collaboration.

Hence, the standardization and normalization of the pathology process serves as crucial cornerstones for ensuring accurate pathology diagnosis. Establishing clear and standardized protocols within the workflow is essential to minimize errors and ensure precision throughout the diagnostic journey.

The Developed Pathology Department Information Management System

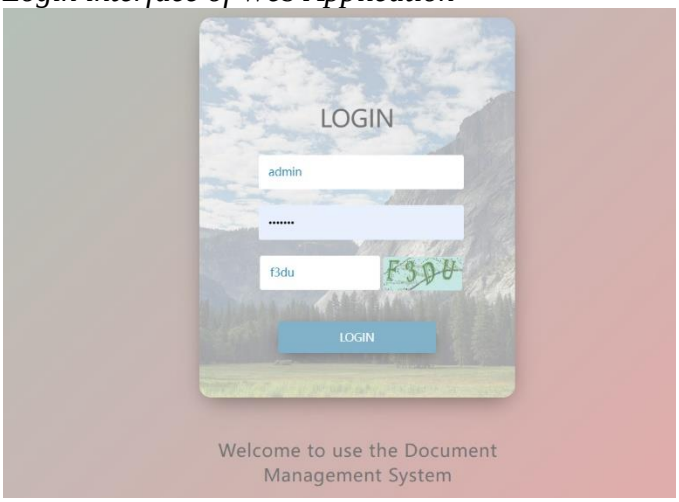
The development of the Document Management System aimed to enhance the efficiency and security of internal document transmission at Guangdong Innovative Technology Vocational College, reducing operational costs and optimizing the college's workflow. The implementation of this system was anticipated to enhance overall work efficiency, reduce human errors, strengthen information security, and offer a more convenient and reliable solution for information management at the college. Adopting a "Web Desktop" approach, the system prioritizes convenient network access through web browsers. Its Web desktop component encompasses various basic functions, facilitating seamless file sharing, centralized upload and download, real-time tracking of file statuses, personnel management, work discussions, school

notifications, laboratory applications, finance management, and more.

Access from mobile devices involves logging in through a mobile webpage. The system's design not only caters to diverse business requirements in daily operations but also emphasizes ease of operation and maintenance. Design principles revolve around user-friendliness, with a focus on security, efficiency, stability, and quick responsiveness.

This sophisticated system was meticulously crafted to address the daily operational needs of users while ensuring operational simplicity, security, stability, and timely effectiveness. With the introduction of this system, the college aimed to enhance overall work efficiency, reduce operational costs, and provide a dependable solution for information management, thereby fostering the sustained development of the institution.

Figure 7.
Login interface of Web Application

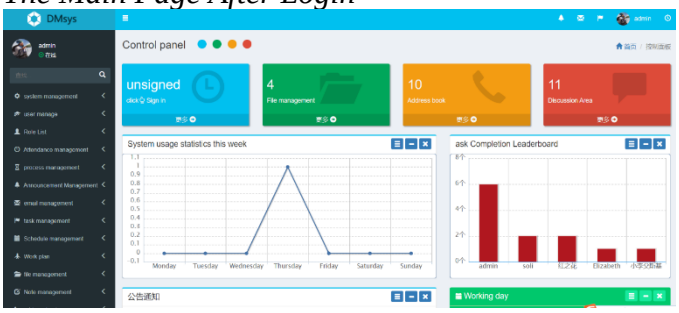


Each user possesses a unique account along with specific roles and permissions. Consequently, during system login, users with different roles encounter distinct functional modules in the menu bar, granting access only to functions for which they have the appropriate permissions.

Once users successfully complete account verification through the login interface, the system automatically redirects them to the corresponding main interface. This personalized navigation mechanism ensures that users can directly access the main interface aligned with their roles and permissions, thereby enhancing system usability and user experience. This clever design not only bolsters security but also enables the system's functional modules to precisely cater to the needs of different user roles, achieving more effective permission management.

The captcha before system login serves two crucial purposes. Firstly, it verifies identity, ensuring that the user is a real human rather than an automated program or robot. By requiring users to input a captcha, the system effectively prevents illegal logins through brute force attacks or automated tools, thereby enhancing the security of the login process. Secondly, the captcha acts as a deterrent against specific malicious attacks, such as unauthorized logins and brute force password cracking.

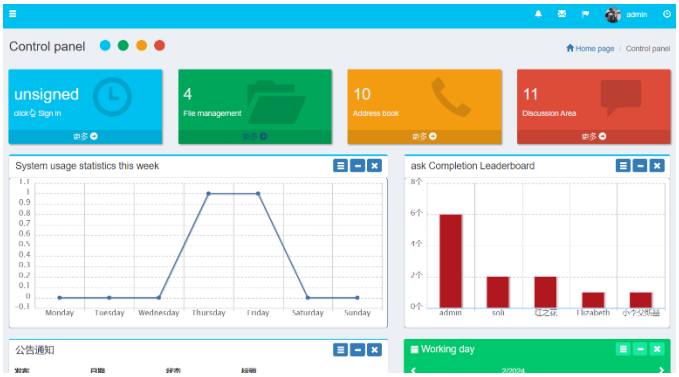
Figure 8.
The Main Page After Login



After a successful login, users are directed to the main page of the system, as depicted in Figure 8. Here, the main functional modules of the document management system are displayed in the left navigation bar. Users can utilize this menu to access relevant operational information through the corresponding modules. Different personnel are granted varying levels of operational permissions

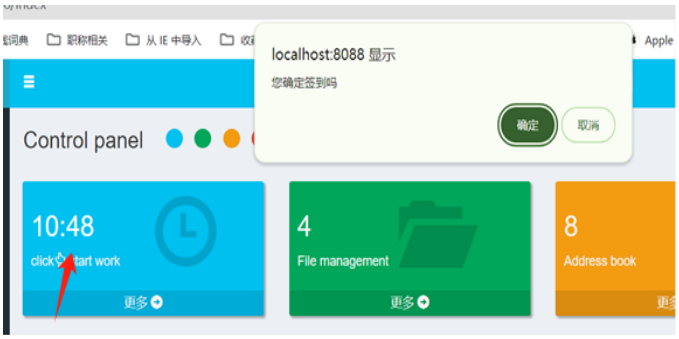
upon login, with administrators possessing the highest authority to configure permissions for each account.

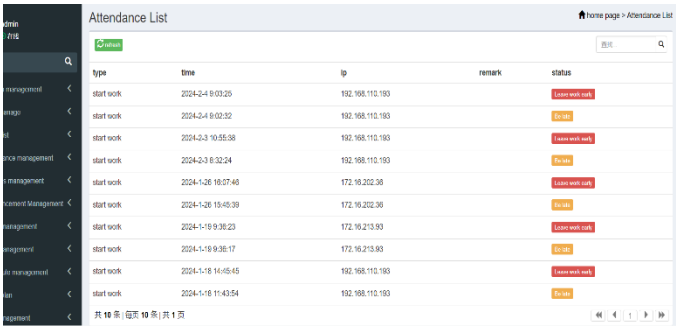
Figure 9.
Home Page Related Data Table and Related Shortcut Icons



On the right side of the homepage, users can find relevant data tables and corresponding shortcut icons. The control panel is customizable, giving users the flexibility to modify theme colors according to their preferences. Additionally, users can easily clock in and out by clicking on the sign-in button available on this page. Moreover, the file management section facilitates a quick transition to the file management page, while the address book offers a convenient shortcut to access the school's contact directory. Furthermore, the discussion area serves as a platform for work-related discussions, enhancing collaboration and communication among users.

Figure 10.
Teacher Check-In Function



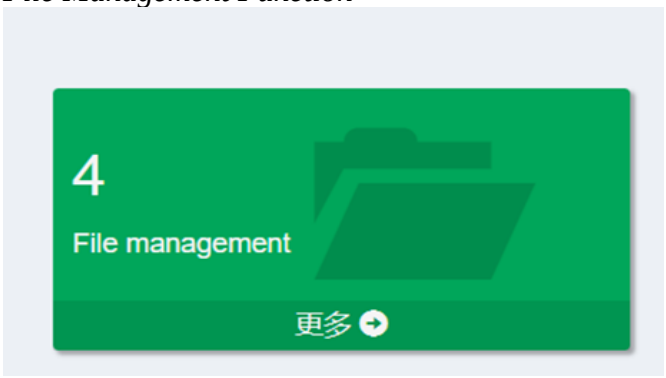


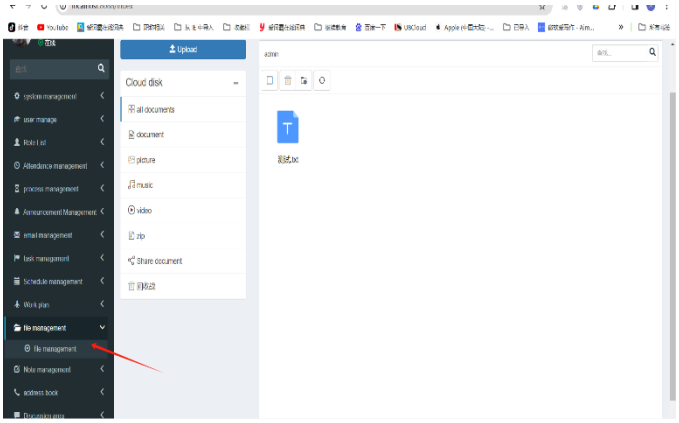
The sign-in function requires users to log in to the school LAN for operation.

Upon logging into the main interface, teachers can efficiently sign in by clicking the red arrow, as indicated in Figure 10. This streamlined process enables teachers, school staff, and management personnel to promptly assess whether teachers have reported to work, providing clear visibility into their attendance status and ensuring efficient monitoring of their presence at the school.

Additionally, users can click "more" below the sign-in module to view the financial records.

Figure 11.
File Management Function





File Management Feature Description

All Files

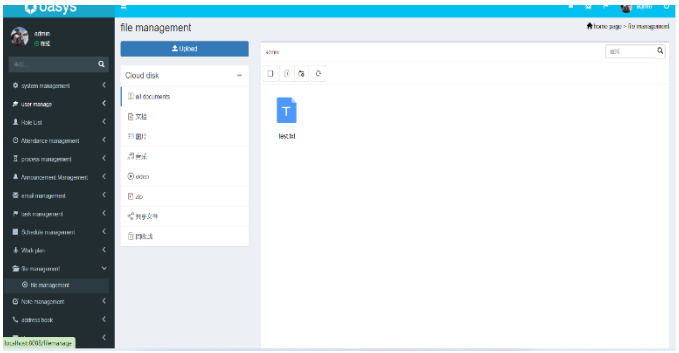
This feature enables users to effortlessly view and manage all of their files. Any files uploaded to the system will be listed here for quick access and editing.

Video file classification. These files typically contain visual elements, representing movies, TV shows, short films, or other visual content, with the focus on images and action. While video files may include audio tracks, the emphasis remains on visual elements. This platform allows school staff to share relevant instructional videos seamlessly.

Audio file Category. This file class is centered around audio content, including music, podcasts, recordings, or other sound materials. Unlike video files, audio files typically contain only the audio track without associated images. Teachers can utilize audio file sharing to distribute teaching-related audio materials effectively.

File Management Feature Description

Figure 12.
File Management Function

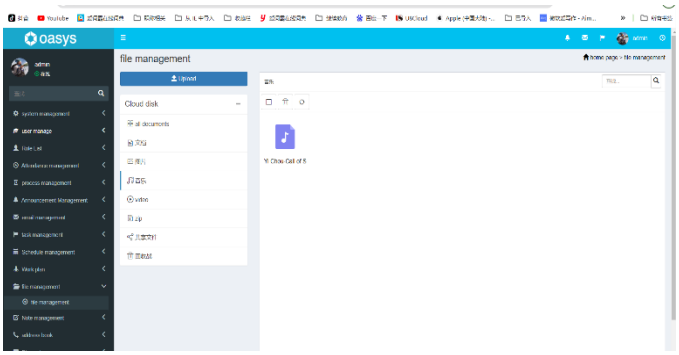


All Files

This feature streamlines users' ability to view and manage all their files effortlessly. Every file uploaded to the system is listed here for quick access and editing. Through this feature, users can conveniently browse through all the files they've uploaded, whether they're documents, images, or other file types, facilitating more effective organization and management of their file resources. Additionally, the feature offers search and filtering capabilities, enabling users to swiftly locate desired files based on criteria such as file name, type, or upload date, greatly enhancing efficiency in file retrieval. In summary, the All-Files feature provides users with a convenient platform to more easily manage and utilize their file resources, contributing to improved work efficiency and overall user experience.

Moving on to video file classification, these files primarily consist of visual elements, typically representing movies, TV shows, short films, or other visual content. While video files may include audio tracks, the main focus remains on images and action. This platform allows school staff to share relevant instructional videos conveniently.

Figure 13.
Audio file Category



Audio file Category. This file class primarily centers on audio content, including music, podcasts, recordings, or other sound materials. Unlike video files, audio files typically contain only the audio track without associated images. Teachers have the option to share teaching-related audio files through audio file sharing platforms.

Figure 14.
Upload Files, Pictures, Compressed Packages

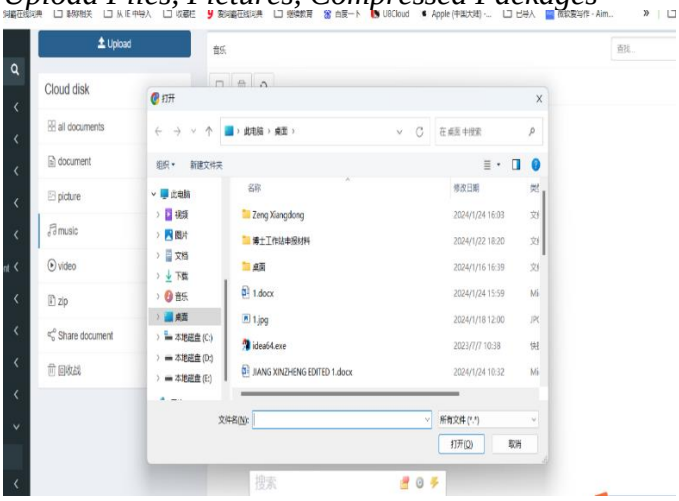
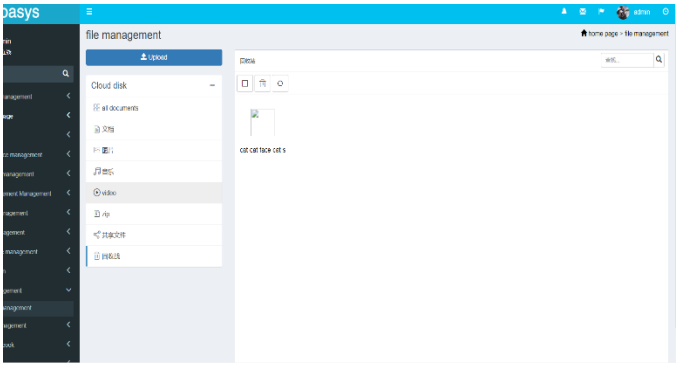
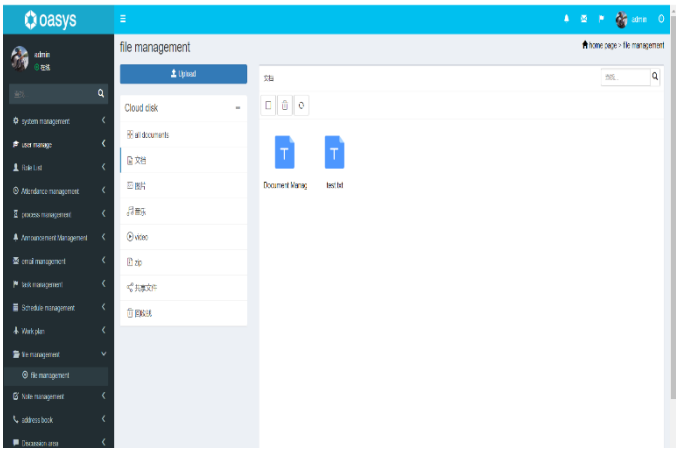


Figure 15.
Recycle Bin



Recycle Bin. The Recycle Bin function is an integral part of the file management system, designed to ensure the safety and integrity of files. When users delete files, they are not permanently removed but instead moved to the Recycle Bin for temporary storage. Within the Recycle Bin, users can effortlessly view, restore, or permanently delete files. This feature effectively prevents accidental deletion of important files and offers users the opportunity to recover files when needed. By providing such functionality, the Recycle Bin enhances the flexibility of file management and significantly improves the overall user experience.

Figure 16.
Documents



Documents. The Documents feature centrally displays all document files, encompassing formats such as Word, PDF, and others. Users can efficiently organize and locate documents based on file types or other filtering criteria. This functionality enhances users' efficiency in managing document resources, allowing them to swiftly locate the desired files and improve work efficiency.

Figure 17.
Image Storage

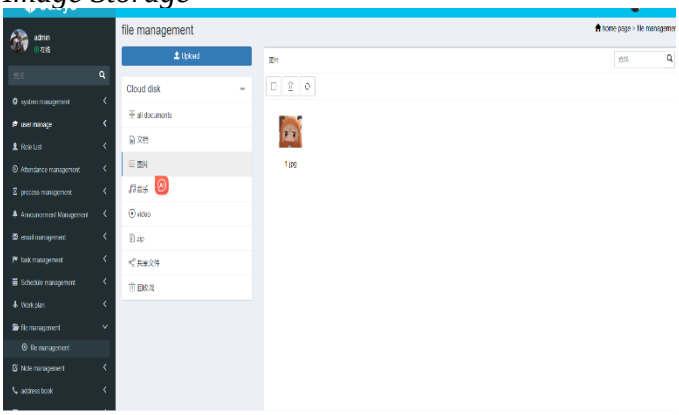
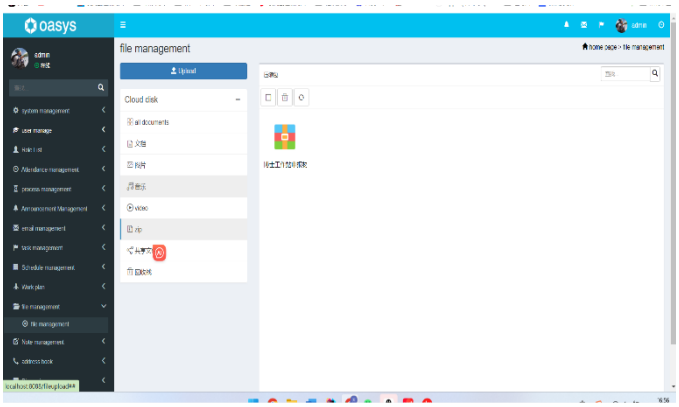


Image Storage. The image storage feature empowers users to seamlessly store, manage, and browse image files within the file management system. Users have the flexibility to upload various types of image files and establish folders for efficient organization and categorization. Moreover, the feature offers preview capabilities, enabling users to swiftly preview image content. Additionally, users can utilize search and filtering functionalities to promptly locate desired image files. Overall, the image storage feature not only provides users with convenient tools for managing images but also effectively safeguards and preserves image resources, catering to users' needs for image files in both work and academic settings.

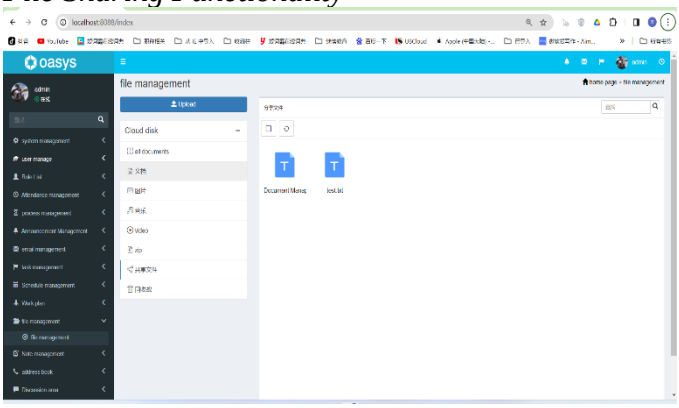
Figure 18.
Compressed File Storage Functionality



Compressed File Storage Functionality

The compressed file storage functionality is indispensable in document management systems, serving as a pivotal tool for users. It enables them to compress multiple files or folders into a single compressed file, such as ZIP or RAR format, effectively reducing file sizes and conserving storage space. This feature holds particular significance when managing large quantities of files or files with substantial sizes. By compressing files, users can streamline file transfers, saving network bandwidth and transmission time in the process. Furthermore, the compressed file storage functionality enhances file security by mitigating the risk of inadvertent data leaks. Users can leverage this feature to organize and back up files, as well as swiftly locate and extract file contents when needed.

Figure 19.
File Sharing Functionality



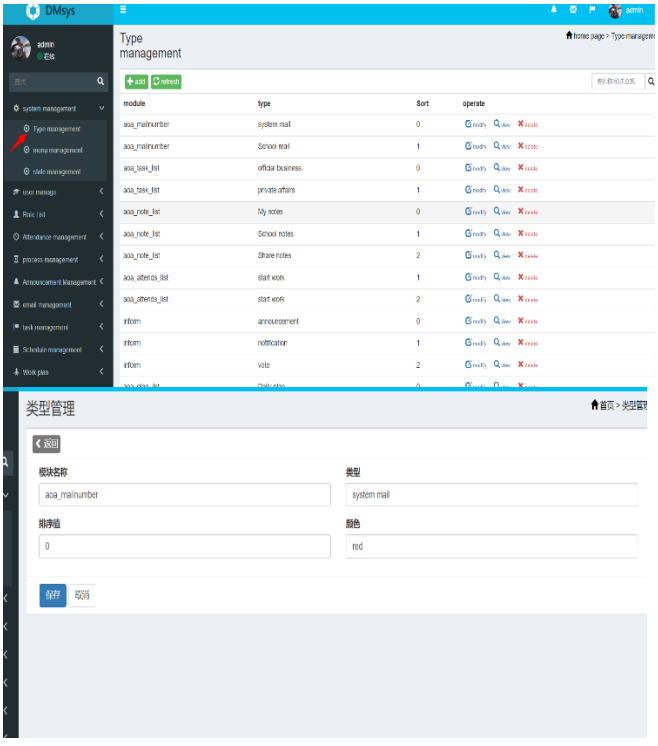
File Sharing Functionality

The file sharing functionality stands as another critical feature within document management systems, offering users a convenient way to share files or folders with others. Users can selectively share specific files or folders with other users or team members for collaborative editing, viewing, or commenting purposes. This functionality provides flexible sharing options, including the ability to set different access permissions such as read-only or edit access, thereby ensuring file security and confidentiality.

Through file sharing, team members can seamlessly share work documents, collaborate on projects, provide feedback, and enhance teamwork efficiency. Additionally, the file sharing functionality facilitates information sharing and communication, fostering collaboration and cooperation among team members.

Figure 20.

Type Management in the System Management Column

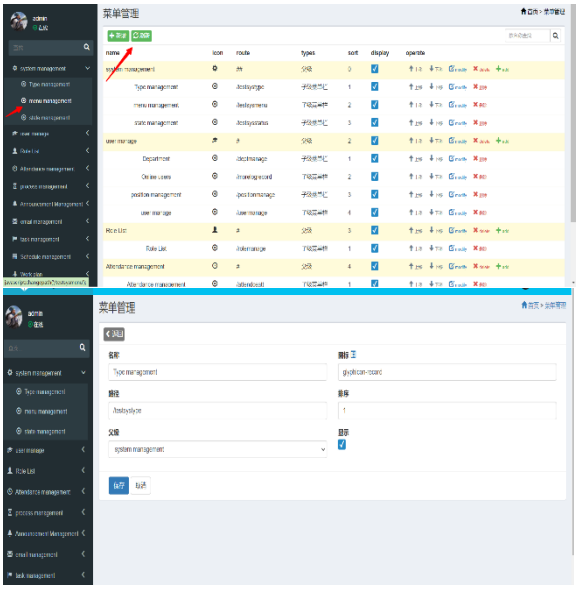


The role type management function within the file management system is pivotal for customization and optimization purposes. It empowers administrators to adjust the names of commonly used role types according to specific organizational needs and structures. This feature enables administrators to customize the titles of role types to better reflect the internal job responsibilities and structure of the organization, thereby enhancing the system's flexibility and customization. By doing so, it ensures that role types closely align with actual job requirements.

Moreover, optimizing role type management improves the user experience by simplifying system operations. Overall, the optimization of role type management provides users with a more personalized and convenient management experience, thereby enhancing system efficiency and usability.

Figure 21.

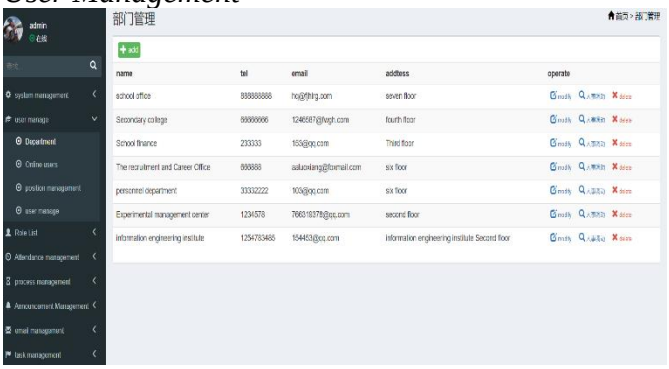
Menu Management in the System Management Column



The Menu Management feature in the System Management column facilitates the modification of menu bar names, adjustments to corresponding language, and related type functions. Additionally, it allows for the reordering of selection window layouts, among other functions.

Figure 22.

User Management



In this comprehensive user management interface, we observe four key modules: Department Management, User Login Records, Position Management, and User Management. Each module plays a crucial role in ensuring smooth internal organizational processes and effective management.

Department Management allows for structured organization and coordination of different departments within the system.

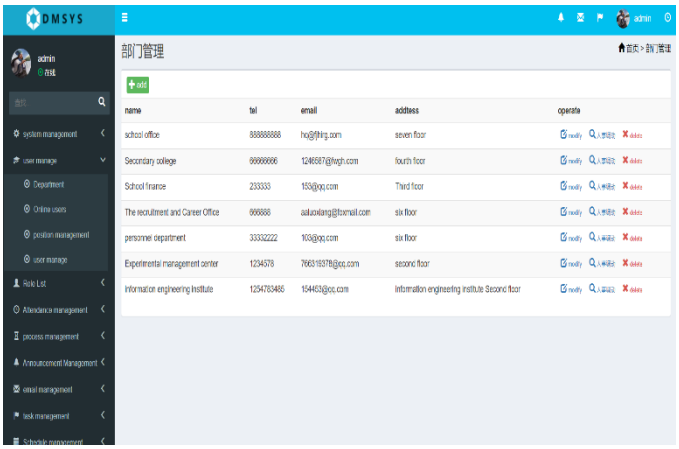
User Login Records track and monitor user activities, providing insights into system usage and security.

Position Management facilitates the assignment and tracking of roles and responsibilities within the organization.

User Management centralizes the administration of user accounts, permissions, and access levels, ensuring efficient user handling and security protocols.

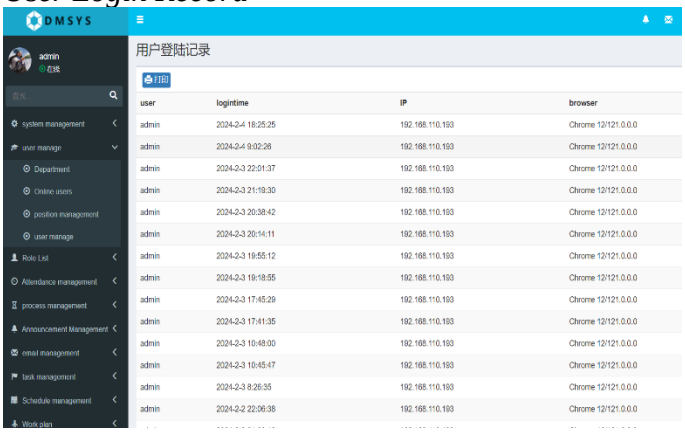
Together, these modules form the backbone of the user management system, optimizing operational efficiency and enhancing organizational governance.

Figure 23.
Department Management



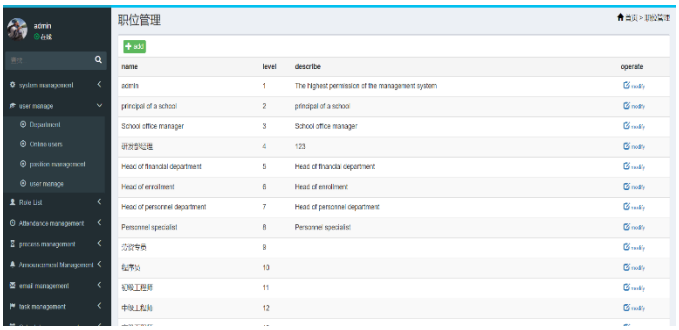
This module primarily focuses on the overall management of departments, encompassing office locations and personnel information. Administrators can easily maintain and update department-related details, thereby ensuring organizational clarity and the efficiency of collaborative work.

Figure 24.
User Login Record



This module offers administrators real-time monitoring tools for online users. By accessing login records, administrators can track vital information about logged-in users, including login credentials, IP addresses, browser details, and login times, and print related records. This feature supports security and supervision, facilitating convenient school safety management.

Figure 25.
Position Management

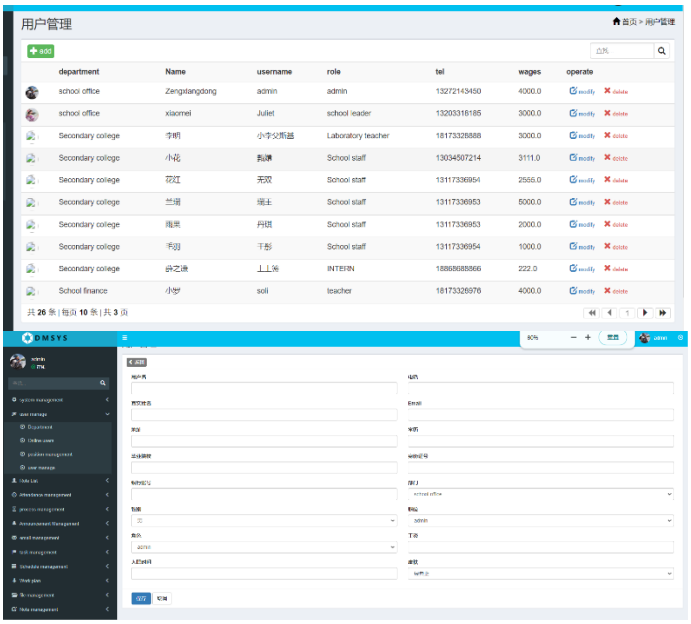


Position management in the file management system is pivotal for ensuring efficient organizational structure and workflow. It empowers administrators to define and allocate roles and responsibilities to users based on their positions within the organization. This functionality facilitates effective delegation of tasks, ensuring that each user has appropriate access rights and responsibilities aligned with their role.

Moreover, position management enables hierarchical organization, streamlining communication channels and decision-making processes. By assigning positions, the system maintains clarity in responsibilities, enhances accountability, and promotes effective collaboration among team members.

Overall, position management significantly contributes to optimizing workflow efficiency and maintaining organizational structure within the file management system.

Figure 26.
User Management

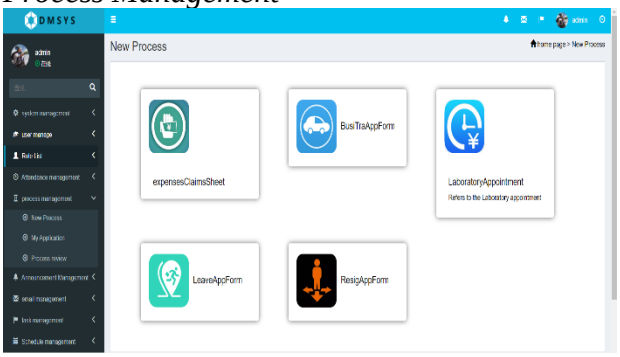


The User Management Module is a core responsibility for administrators and authorized personnel. They are tasked with flexibly modifying user account passwords and entering necessary personnel information, including salary accounts and contact details of school staff on this page. These updates not only link to the internal directory but also encompass user profiles and payroll management, ensuring the consistency and completeness of school personnel information.

The synergy of these four modules constitutes a comprehensive and robust user management system, providing an efficient, secure, and integrated management experience for school personnel management.

Figure 27.

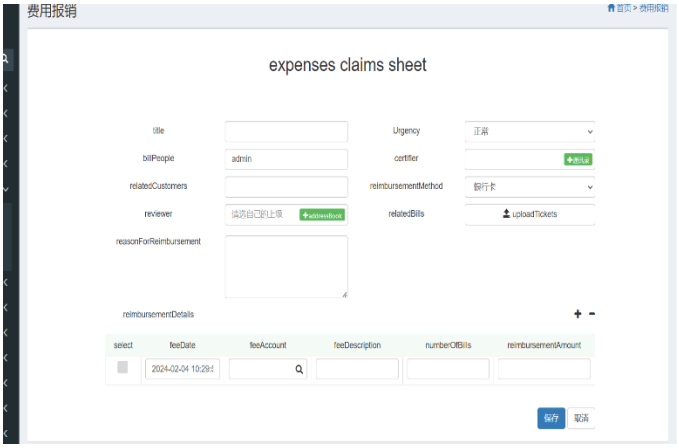
Process Management



In the realm of workflow management, there are five distinct projects: financial reimbursement, business trip application, school laboratory usage request, leave application, and resignation application. These components are designed to efficiently manage various aspects of business processes, encompassing financial transactions, travel plans, laboratory resource utilization, employee leave, and the resignation process. Through these projects, organizations can conduct their operations in a more seamless and organized manner, ensuring the judicious utilization of resources and the standardized handling of employee affairs.

Figure 28.

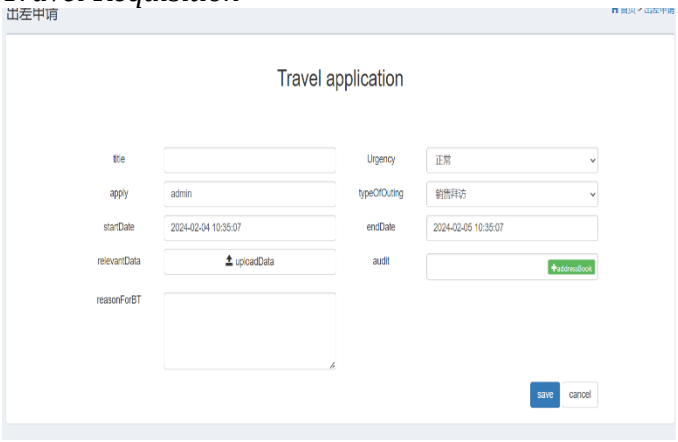
Financial Reimbursement



Financial Reimbursement. Upon accessing the financial reimbursement module, school staff can complete reimbursement documentation and submit relevant materials. Leveraging the financial reimbursement feature, employees at the school can conveniently and swiftly submit reimbursement requests for various expenses, covering everything from travel costs to office supplies. This ensures the efficient management of the expense reimbursement process, providing timely reimbursement services for employees, while also contributing to the effective supervision and control of the school's finances.

Figure 29.

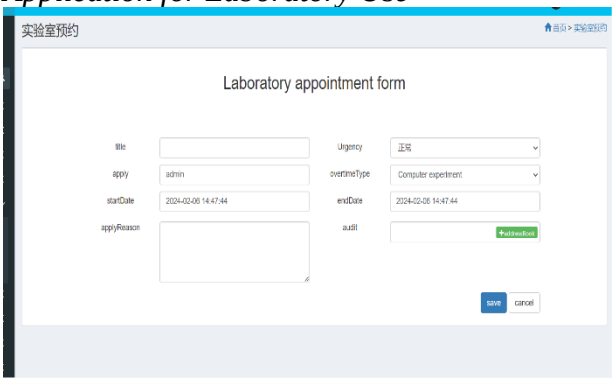
Travel Requisition



Business Trip Request. Teachers or school staff can fill out a business trip application using this feature, allowing employees to submit detailed travel plans, including itinerary, transportation, and accommodation arrangements. This ensures the reasonableness of the business trip activities and the efficient utilization of school resources. The functionality provides a clear overview of the business trip plan for management.

Figure 30.

Application for Laboratory Use



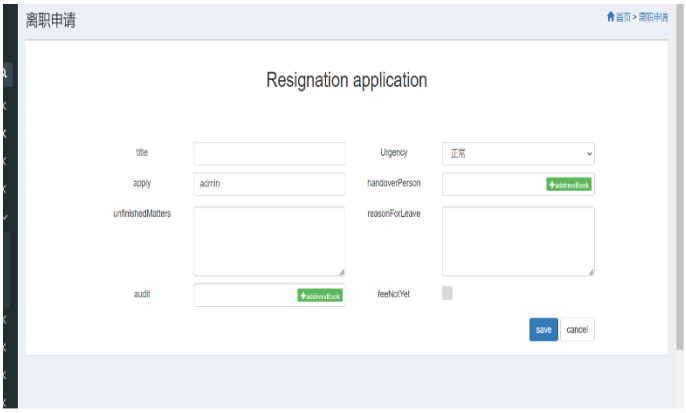
Application Form for School Laboratory Use. School teachers can effectively use the experimental

teaching resources of the school by filling out the application for the use of the school laboratory. The application function of the school laboratory provides a transparent application process for teachers and students, including the experimental plan and equipment requirements, so that the laboratory management teacher can efficiently allocate laboratory resources and ensure the rational use of the laboratory.

Figure 31.
Travel Requisition

Leave Application. The leave application function allows employees to submit all kinds of leave applications, including personal leave and sick leave. The reasons and duration of leave are provided. There are detailed explanations in the leave Instructions about the types of leave and the length of time that can be applied for different leave. Leave application can ensure the standardization of leave process, provide management with timely understanding of employees' leave situation, and facilitate flexible work arrangement. Effectively reduce the work process of school personnel management department for schoolteachers' leave applications.

Figure 32.
Travel Requisition

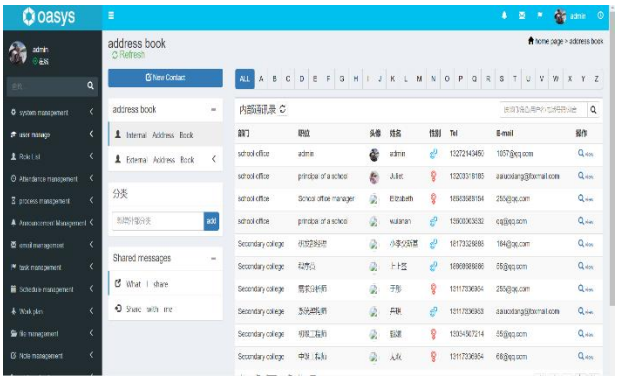


The resignation application feature holds significant importance for school management and organizational operations. It enables faculty and staff to submit resignation applications, allowing school administrators to promptly grasp and address employees' intentions to leave. Through this feature, faculty and staff can conveniently fill out and submit resignation application forms, providing necessary details such as reasons for resignation and departure dates.

School administrators can then receive applications in a timely manner, conduct approvals and processing, including arranging departure procedures and replacing job positions. This functionality assists school administrators in promptly understanding employee turnover, facilitating effective human resources planning and management to ensure smooth staff turnover and organizational functioning.

Additionally, by digitizing the resignation application process, it reduces cumbersome manual operations, enhances work efficiency, and establishes a comprehensive human resources management system for the school, promoting its long-term development.

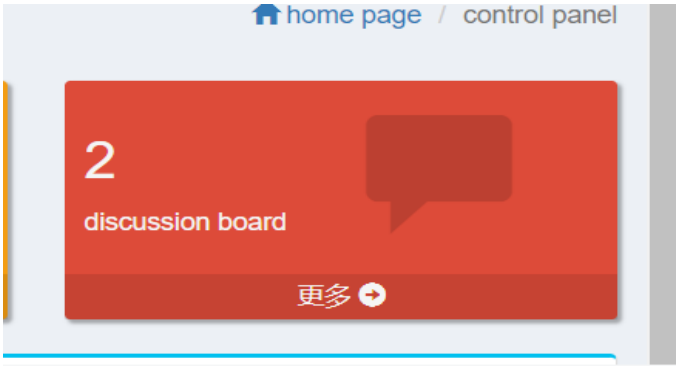
Figure 33.
Address Book

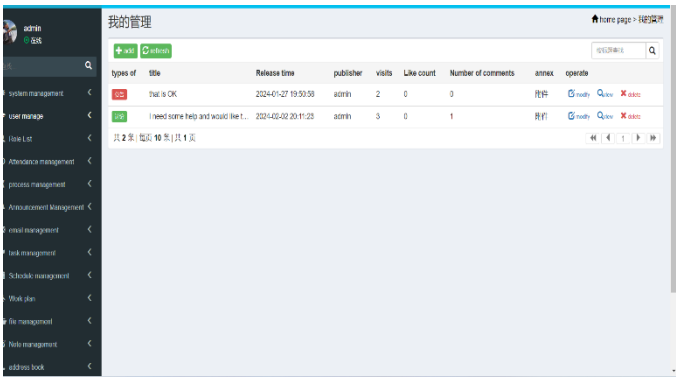


In a document management system, the address book holds significant importance. First, it comprehensively records the contact information of various departments, faculty, and students within the university, including names, positions, phone numbers, email addresses, and other key details. This recording method facilitates convenient and prompt internal communication and correspondence.

Second, the presence of an address book enables swift and accurate locating and contacting of specific individuals when needed, which is particularly vital during emergencies, thereby enhancing work efficiency and collaboration. Additionally, the address book serves as a vital tool for managing university resources.

By maintaining and managing the address book, the university can better plan and allocate human resources, ensuring the orderly progress of various tasks. In summary, the address book plays an indispensable role in the document management system of a university, providing crucial support for efficient management and smooth operation.





In the document management system, the discussion forum plays a crucial role. Teachers log in to their accounts to access the forum, where they can engage in discussions, provide suggestions, and share experiences related to the system.

First, the forum serves as a platform for faculty and staff to exchange ideas and insights regarding the document management system. Secondly, it facilitates knowledge sharing and collaboration, allowing users to discuss problem-solving methods, techniques, and best practices, thereby enhancing work efficiency and learning outcomes.

Additionally, the forum serves as a vital channel for problem resolution, enabling users to seek assistance and answers from others. In summary, the discussion forum in the university's document management system fosters communication, knowledge sharing, and problem-solving, contributing positively to system efficiency and user satisfaction.

Extent of Compliance with ISO/IEC 25010 Criteria

In this section, an evaluation of the developed system's adherence to the ISO 25010 software quality standards was conducted which involved functionality, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability. This assessment took place following the formal approval, introduction, and practical utilization by information technology experts.

CONCLUSION

Based on the results, the researcher drew the following conclusions:

The implementation of the document management system will significantly enhance the accuracy of school document management, strengthen the timeliness of school office operations, and elevate the overall management level. Additionally, by implementing this system, schools can create conditions to reduce management costs and improve office efficiency. This achievement will effectively lower office costs, boost management efficiency, and address issues in school and personnel management

RECOMMEDATIONS

Based on the findings presented and the conclusions drawn, the researcher recommends the following:

1. Guangdong Innovation Technology Vocational College may consider adopting and implementing the developed system to provide convenient and enhance administrative efficiency for school management and staff.

2. The administrators of Guangdong Innovation Technology Vocational College may consider supporting the implementation of Document Management System, thereby offering improved maintenance services for the school's management, teachers, and staff.

3. The researcher should provide training for users to ensure the correct use and implementation of the system.

4. Future researchers may explore system upgrades, integrating intelligent automation, emphasizing collaborative work, enhancing security and privacy, supporting cross-platform mobile office, and achieving personalized customization and environmental sustainability to further enhance the developed system.

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