

Optimization and Construction of Collaborative Office under the Background of Smart Campus in Universities

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Abstract

At present, with the continuous development of technologies such as the Internet, big data, and artificial intelligence, smart campuses in universities are being rapidly constructed. Improving the informatization level of administrative management work is also an important content. The collaborative office work in multiple departments requires more standardized, convenient, intelligent, and secure office systems. In response to this issue, this article analyzes the optimization and construction process of collaborative office systems based on the development of university informatization, summarizes the operational results, and explores the prospects of smart office.

Keywords

Collaborative Office, Office Automation, OA, Smart Campus, Informatization, Administration

1. Introduction

With the rapid development of global science and technology, especially the widespread application of high-tech such as big data, cloud computing, virtual reality, and artificial intelligence in recent years, the informatization of universities has reached a new stage, which is a smart campus with highly integrated network, information, technology, and services. The collaborative office system is used in university administrative management and it has also received high attention. By building an excellent office platform, it can improve the decision-making level of the leadership, further improve office efficiency and scientificity, enhance office intelligence and security, improve comprehensive management capabilities, and promote the efficient development of education in-

formatization.

2. Background of Collaborative Office System Construction

In 2018, the Chinese national standard “General Framework of Smart Campus” was officially released, standardizing the content of smart campus, and the Ministry of Education released the “Education Informatization 2.0 Action Plan” in the same year, through the implementation of this plan, the construction of digital campuses will basically be realized to cover all the schools by 2022, and a big platform of “Internet plus Education” will be built, exploring a new mode of education governance in the information age [1]. At present, 5G, big data, cloud computing, artificial intelligence, virtual reality and other technologies have been widely used in university campuses, promoting university informatization from digital campuses to smart campuses, and playing an important role in innovation and transformation in education. The deep integration of network, data, business, and users, gradually realizes the modernization of human-centered education [2].

As an important way of informatization in university administrative management, office automation can significantly improve work efficiency, strictly regulate process progress, assign responsible persons, reduce office costs, analyze transaction patterns from various business data, improve the decision-making level of leadership managers, and is widely used within universities [3]. In the current trend of mobile and intelligent technology development, the traditional office automation model is increasingly showing its shortcomings. It is urgent to comply with the development of smart campuses, strengthen integration with other business systems on campus, and make office more convenient and intelligent.

3. Current Status of Collaborative Office Work in Our University

3.1. The Achievements of Informationization

Based on the information technology development status of our university, the construction of digital campuses is relatively mature. All buildings have been connected to wired and wireless networks, allowing users to connect to the network without any perception anywhere on campus. We have built a university wide data center, a unified identity authentication platform, a unified information portal, and an online service hall. The information portal integrates business management systems of various departments within the university. Users can log in to the information portal once and enter various management systems to handle related business. The collaborative office system is an integrated management system.

3.2. The Usage of Collaborative Work

The collaborative office system, as an integrated system in the information por-

tal, has achieved complete and mature applications through computer browser access, using the unified identity authentication platform on campus to log in. The regular functions include document receiving management, document sending management, inspection and supervision management, schedule arrangement, meeting management, notice announcement, seal application, leave management, free collaboration matters, knowledge document management, personnel role management, department position management, etc. In 2020, it has been popularized and widely used throughout the university. The procedural management of matters has fully improved the standardization of work, clarified the responsibilities and overall work progress of departments and personnel, improved office efficiency and transparency, achieved paperless office work, saved resources, and received good operational results.

3.3. Issues Exposed in Collaborative Office

With the overall improvement of campus informatization, our university has made significant progress in data center construction, business information integration, data fusion analysis, and smart classroom construction, and the construction of smart campuses is gradually strengthening. In this situation, the shortcomings of collaborative office system are also exposed. Firstly, the development of big data, artificial intelligence, and mobile portable devices has put forward more requirements for the convenience, integration, and intelligence of office work, mainly reflected in: users hope that the office platform can be more friendly, operate more simply, do not require special technical training, and can efficiently and freely handle personal work without being constrained by equipment, space, and time; Able to handle all to-do tasks within a familiar office system, and receive important information from other business systems in addition to existing collaborative office information; Can intelligently search for and obtain recommendations, and obtain scientific analysis of results based on data mining. Secondly, with the significant increase in various types of data, storage and security have been challenged. How to ensure that users can communicate and handle affairs conveniently, while also ensuring the secure transmission of information, and preventing sensitive data leakage, is a growing concern in the internet world.

4. Specific Objectives of Collaborative Office Optimization

Based on the analysis of the operation status of collaborative office system in recent years and the actual problems reported by users, there are mainly the following issues in collaborative work:

4.1. Resolve Plugin Installation Issues

The collaborative office system on the computer side has very complete functions for handling official documents, but there are limitations on the operating system and browser version of the computer, requiring the installation of dedi-

cated browser plugins and relying heavily on three browsers (Google, IE, 360 browser). If the computer or browser version is upgraded, it is often necessary to reinstall the plugin, otherwise it cannot be used for document viewing and editing. This creates technical requirements for users, often resulting in reduced efficiency and delays due to installation issues with office computer plugins. The most important goal of upgrading and optimizing is to solve this problem, so that users are no longer trapped in the settings of the software environment.

4.2. Enhance Portable Processing Capabilities

The current development of science and technology makes mobile portability become an urgent need for work functions. The university leaders and middle-level cadres often go out for business and meetings, which makes it difficult to approve business processes in a timely manner, resulting in time-consuming waiting for subsequent processes. Therefore, it is hoped that regardless of the office, meetings, business trips and other scenarios, users can be unrestricted by equipment, location, time, and timely handle personal business, improve efficiency.

4.3. Realize Integration with Critical Business Systems

The current large-scale use of management systems requires data consistency and linkage. Firstly, it is necessary to strengthen the ability to synchronize basic data with the data center, eliminating the phenomenon of “information silos”, and achieve the standardization and consistency of basic information of departments and personnel. In addition, it is also necessary to be able to receive linkage information from other important business systems on mature office platforms, such as financial reimbursement information, asset processing information, contract progress information, etc., without the need to frequently enter multiple business systems to handle corresponding affairs, achieving the rational allocation of resources [4].

4.4. Increase Safety Features

Matters circulating on campus, especially sensitive and confidential content, need to be handled within a secure channel to avoid unnecessary security incidents through the public media.

5. Optimization Implementation and Achievements of Collaborative Office

5.1. Previous Experience in Information Technology Work

Based on our experience in information technology work, the most common problems with information technology work in business departments are [5]:

- 1) Insufficient top-level design. The lack of systematic planning leads to the construction of information technology work which is urgently needed, without

considering long-term and overall needs. In the later stage of construction, it will cause more problems or repeated construction.

2) Lack of information technology construction concept. Only moving the business online without organizing and scientifically optimizing the management model has resulted in the expected efficiency of online work not being achieved.

3) Lack of IT professionals. The advantage of professional talents lies in their understanding of both business needs and technical scope, and their ability to judge the degree to which business and technology can be perfectly integrated during construction. Lack of relevant talents can lead to slow construction progress, poor achievement of goals, and difficulty in maintenance after use.

5.2. Collaborative Office Optimization Implementation Process

Based on past experience and practical issues in office work, the implementation will be organized according to the following key points.

1) Teamwork between technical and management personnel

The management personnel are mainly responsible for conducting extensive research and needs sorting. The work led by the university leaders and the office of the president of the university, organizes information administrators from various secondary departments to collect needs, with a focus on documenting the pain points and difficulties used by faculty and staff. Technical staff is responsible for determining the feasibility of the demand, to determine which problems can be solved by the program, which problems can be solved by workflow optimization. After collaboration between both parties, the final optimization requirements are formed.

2) Launch workflow

A workflow has been developed as shown in **Figure 1** below. In this process, the technical team needs to provide full support from the beginning, as the collected requirements are numerous, miscellaneous, and unstructured. The task of identifying essential problems requires professional personnel to identify them. The sorted problems will be upgraded and optimized according to their importance, and then put into use. Based on the actual user experience, they will be gradually refined and improved, ultimately achieving good operational results.

3) Environmental construction

For this upgrade, one physical machine is prepared to run the database, and

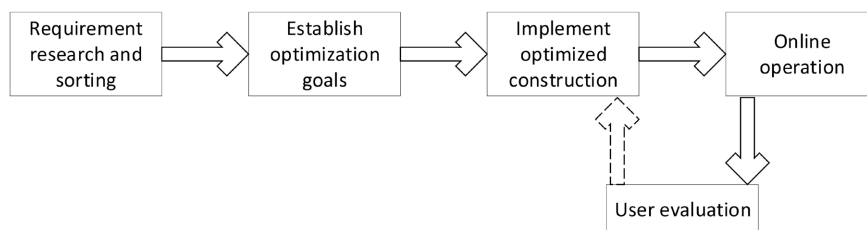


Figure 1. Optimization workflow diagram.

three virtual machines are prepared to run the application program, document online processing service, and PC-client program service, all four server operating systems above use domestic programs. After the operating environment reaches the upgrade standard, the original program before the upgrade is first migrated to the new platform, and then modified and optimized according to the new requirements, so as to achieve a mature and stable operation effect on the new platform.

4) Technical proposal

- Function code upgrade: Transform the functions that rely on plugins into functions that can be processed online. The processing function can call server programs online, transforming customers' own technical pressure into function calls between servers, and releasing usage pressure.
- Interface function upgrade: Expand mobile access methods, expand interface docking capabilities, and increase the interaction effect of information system docking.
- Security upgrade: Try to use localized resources for server and service environments, and deploy them in university server room.
- Enhance friendliness: Optimize discovered issues and user interfaces.

5) Operational system guarantee

In order to guarantee the daily standardized operation of information work, in addition to the backend operation and maintenance of the technical center team, our university has also established a network information communication system this year, and each secondary department has set up a network information officer position, responsible for information technology and security matters within the department. Through this platform, many upgrades and optimizations related to collaborative work can be communicated and collaborated with various user units in a timely manner, which is also a solid and powerful guarantee for long-term operation and maintenance in the future.

5.3. Optimized Operational Effectiveness

According to the above implementation methods, the overall construction effect is shown in **Figure 2**, and the specific results are as follows.

1) Implement plugin free mode on the computer end, which can be used directly without any technical training

In the daily operation status, the biggest feedback from users is that the installation of plugins affects the experience of using the program. The optimization construction upgraded the document processing program to a non-plugin mode, which allows users to freely process documents, forms, matters, the operation is no longer tied to any settings on the local computer terminal, so that the user, regardless of the computer terminal, using any version of the browser, can conveniently deal with the affairs, and users no longer need to be trained for the installation of plugins, which greatly improves the user-friendliness.

2) Add the way of using system

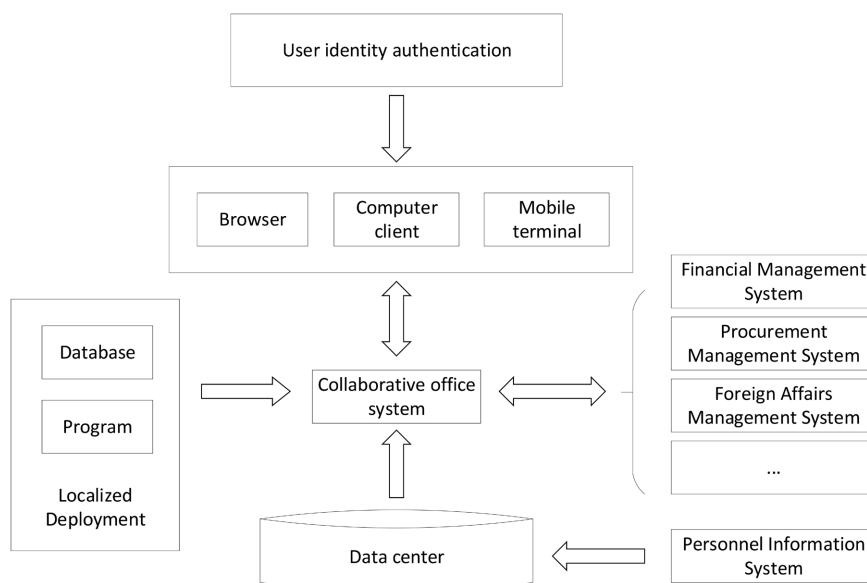


Figure 2. Business integration diagram.

Although using a browser to access the system solves the plugin problem, the browser itself has a limit on how long a page can be displayed, so if there is no interaction within a certain period of time, the page will be invalidated and user will need to log in again. For those who use the office system in the office, it is not convenient to log in again when they stop to do other tasks and return to the page. In this case, a computer client program has been added, which has the same functionality as the browser page for collaborative work. It is valid for a long time with one login. And the client has a communication medium function, which can facilitate communication with transaction personnel, integrating transactions and communication. It is very friendly for those who frequently use collaborative office systems.

3) Implement portable use of mobile APP

Due to the rapid development of smart phones, in order to realize the goal of mobile office, our university vigorously promotes the use of collaborative office APP, which can quickly handle personal matters anytime and anywhere, especially urgent or unexpected affairs. And the APP integrates communication functions similar to WeChat, including the university's administrative personnel address book, creating a specialized communication platform for office staff, which can no longer rely on public communication tools.

4) Realize integration with data platforms and important business systems to achieve intelligent use and resource sharing

After optimization, the office system has been integrated with business systems such as our data platform, financial approval system, bidding and procurement system, audit and review management system, and foreign affairs management system. Organizational structure, personnel information, and other basic data are synchronized from the data center on a regular basis to ensure the

consistency and standardization of basic information. For other business systems with high user attention, information interaction and integration can be done, and the latest to-do information can be received from the collaborative office platform. Simply click can jump to processing. We have achieved business interconnection between information systems based on standardized business data, established a one-stop administrative management work mode, achieved data capture, intelligent application, and scientific statistical analysis within the office system, and achieved efficient sharing of resources and data, as well as reasonable adaptation of resources and personnel [6] [7].

5) Increase safety features

All programs and database servers use on-campus servers, canceling the cloud service of off-campus network used for some functions, ensuring that all flow of official documents and other transactional information are stored in on-campus devices with unified backup management, and realizing private deployment. The mobile APP can be bound to the cell phone hardware, and the login password can be changed through cell phone SMS verification and email verification. The whole set of collaborative office system has passed the national information security level protection audit, with comprehensive protection guarantee.

5.4. Result Inspection

Since the upgrade is finished in June, the system has been running steadily for 5 months, and the efficiency of common process approval has significantly improved. The average processing time has been shortened from 1 day in May to 6 hours in October. The mobile access volume has reached 80% of the total access methods, significantly improving the efficiency of work staff.

6. Summarize

With the construction of smart campuses in universities, teaching and management have been highly integrated, posing higher requirements for the efficiency of daily administrative work. In the future, collaborative work will also develop towards a more intelligent direction, such as making forms and processes intelligently generated based on actual documents, intelligently supervising according to process cycles, intelligently evaluating work performance, and intelligently generating report results based on the completion of tasks. This will highly integrate people, events, and meetings, and intelligently analyze them. Intelligence will be an important aspect of future development. Improving the performance of the office platform can not only improve office efficiency, but also scientifically enhance the decision-making power of the leadership, drive positive changes in management models, promote the improvement of education quality and the better development of educational informatization, and enhance the competitiveness of the university. Therefore, the intelligence of the office system will become the focus of future work, and there are still many development directions worth constantly trying.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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