

# Research and Practice of Online Service Hall in Colleges and Universities

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## Abstract

The needs of teachers and students, the requirements of educational modernization and informatization and the development of information technology promote the online service hall to become an important part of the smart campus. The online service hall is also a hot spot of information construction in universities in recent years. Taking China University of Geosciences (Beijing) for example, this paper probes into the problems and causes of the current difficulties of teachers and students in complicated school's business process and puts forward the construction goal and ideas of the online service hall. A four-layer architecture which includes data layer, business service support layer, business service layer and presentation layer for service e-hall is designed and the organization and implementation steps of the online service hall are expounded. In addition, the extended applications such as integrated self-service printing terminal and electronic signature are considered. This paper can be used for reference for the construction and implementation of online service hall in other universities.

## Keywords

Smart Campus, Online Service Hall, University Informatization, Information Service

## 1. Introduction

It is generally believed that the construction and application of university informatization in China has gone through three stages: first, the construction stage of informatization hardware facilities based on campus network, which started in the 1990s; the second is the stage of digital campus, which began to be popularized around 2000, focusing on business informatization and data resource sharing; the third is the stage of smart campus with intelligent applications and

one-stop service as the core, which started around 2015 [1].

In April 2018, the Ministry of Education of the People's Republic of China officially issued the "Education Informatization 2.0 Action Plan". The document clearly mentioned that the "Internet + Government Services" online service hall should be established to realize the unified application, centralized handling, unified feedback and full process supervision of government services, so as to standardize the list of matters, standardize the work guide, review the work rules and coordinate the business handling, and realize the "one-stop service". This points out the direction for the improvement of university management and information service, that is, to build online service hall, let the data run more, let teachers and students run less, and enhance the sense of gain and happiness of teachers and students.

According to the author's research, from 2018 to 2020, Peking University, Fudan University, Beihang University, Central University of Finance and Economics, China University of Petroleum, Beijing University of Posts and Telecommunications, Beijing University of Chemical Technology, Nanjing University of Posts and Telecommunications and some universities in Zhejiang Province have begun to carry out the planning and implementation of online service halls. This provides valuable practical experience for other universities to build online service halls.

China University of Geosciences (Beijing), the university where the author works, has made some construction achievements after more than 20 years of information construction. The main functional departments, such as teaching and educational administration, scientific research, personnel, finance, assets, and logistics, have built information systems to support their business management. In 2019, the university upgraded the information portal platform, unified identity authentication, data center, collaborative office system and other public information platforms.

However, teachers and students still have difficulties in handling affairs and are not satisfied with information services. The main problems are as follows: First, although the main functional departments have business systems, many business systems do not fully cover their own business matters, and some transactional matters are still offline; Second, some transactional matters for teachers and students are cross departmental and need to be approved by multiple departments. The online flow of these matters is difficult to achieve only by the existing business system within the department; Third, there is no unified information portal that lists all service items and guidelines, which can clearly guide teachers and students to handle affairs.

To sum up, the university online service hall is the inevitable outcome of the development of digital campus to smart campus, is the inevitable requirement of the development of university information service.

## **2. Construction Objectives and Ideas of Online Service Hall**

Guided by serving teachers and students, we transform management into service

and sort out all the service items for teachers and students. After reconstruction and optimization, the service items for teachers and students are classified and comprehensively moved online, so that the data can run more and teachers and students can run less, so as to realize the online “one network”, offline “running once at most”. Construction ideas are as follows:

- Strengthen top-level design and make overall planning [2] [3] [4]

The construction of online service hall is an overall work. The online service hall is an information platform covering the whole university’s affairs for all the teachers and students. It involves all departments of the university and it is by no means a task that the information network center can independently complete. It needs to do a top-down top-level design and overall planning from the technical level and management guarantee level. During the implementation of the online service hall, the school leaders need to pay enough attention to it, the information network center needs to make overall plans, and all business departments need to cooperate actively.

- Systematic and comprehensive investigation, extensive and in-depth research [3] [4]

Through discussion, interview, questionnaire and other ways, we conducted extensive and in-depth research, comprehensively find out the existing information construction situation of all departments of the university, clarify the support of the existing portal websites and all business systems for the service of teachers and students, grasp the needs of all departments and teachers and students for the service of affairs, sort out the list of all affairs service items, and fully demonstrate and communicate according to the actual situation of the items, clarify which are online, which are integrated online and offline, and which are offline. All affairs service items need to sort out standard procedures and standard guidelines.

- Compatible with existing business systems

Fully evaluate the function and value of the existing business systems and avoid repeated construction. For the service items without business system support, they are directly customized to the online service hall. For the service items supported by the business system, if the online functions in the existing business system support the service items well, the functions in the existing business system can be integrated into the online service hall; if the online function in the existing business system does not support the service item well and the use effect is not good, through full discussion with the business department, we can consider re customizing the service item to the online service hall.

- Give consideration to both PC end and mobile end

Adhere to the service concept of taking teachers and students as the center, and take convenience and efficiency as the service tenet. The service items in the online service hall should fully consider the compatibility of mobile terminals, not only to achieve online service items, but also to achieve handheld service items as much as possible.

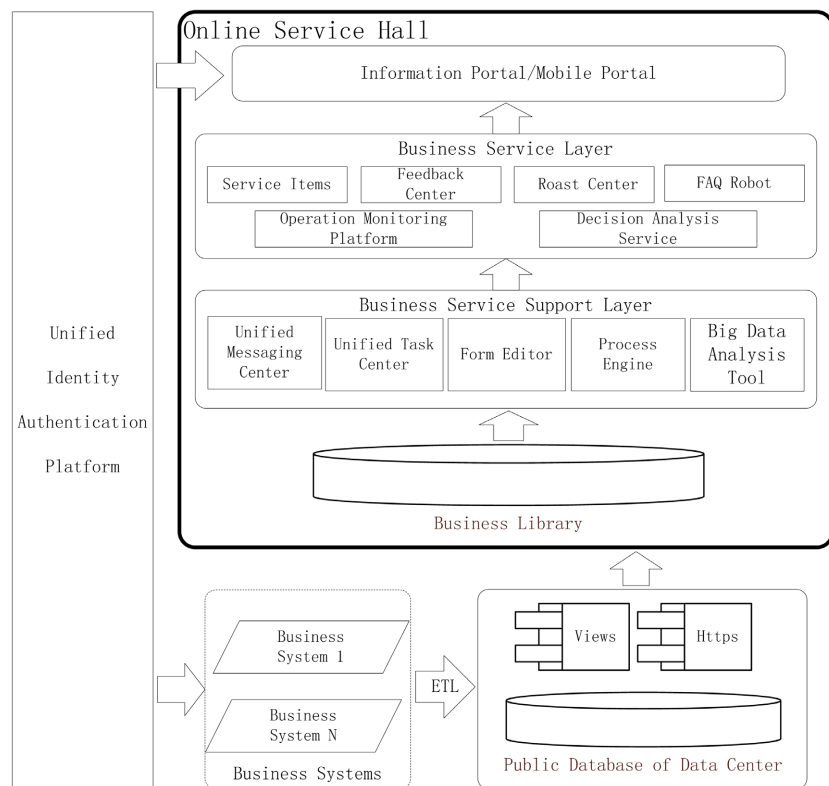
- Strengthen the construction of informatization team [3]

Take the construction of the online service hall as an opportunity, establish and improve an information team covering the whole university to ensure the smooth implementation, application promotion and iterative optimization of the online service hall.

### 3. Design and Implementation of Online Service Hall

#### 3.1. Functional Architecture

Referring to the research results of Zhang, Y. [5], Sun, Q.Ch. [6] and others on the model and architecture of one-stop service hall, combined with the actual situation of our school, the system architecture of our online service hall is mainly divided into four layers: data layer, business service support layer, business layer and presentation layer, as shown in **Figure 1** below. The data layer is mainly composed of the business database, and the basic data such as the organization and user information need to be shared by the digital campus data center. The business service support layer mainly includes form editor, process engine, unified message center, unified task center, big data analysis tool and other functional components. The business service layer mainly includes service items, feedback center, roast center, FAQ intelligent answering robot, operation monitoring platform, decision analysis service and other functional components. The display layer is the campus portal and campus mobile portal.



**Figure 1.** Architecture of online service hall in colleges and universities.

- Form editor and process engine

The university affairs service items are complicated, and the process of items is different from each other. The process of an item itself will also change with the changes of department functions and teachers and students' needs. Therefore, the front form and approval process of the service items must be visual and flexible to meet the actual construction needs. This requires the online service hall technology platform to be built with a visual form editor and a visual process engine, and the form editor, process engine, and user information in the organizational structure are integrated to flexibly configure the filling form and approval process of service items.

- Unified Task Center

For all the service items that have been applied for, a unified task center is provided to gather "My Items", which includes "My Initiated Items", "My To Do Items" and "My Done Items". "My Initiated Items" lists all the service items that you have been applied for. Click one of the items to browse the item details, including the process of the item, "My To Do Items" lists all the items that need you to process, "My Done Items" lists all the items that you have been processed.

- Unified Messaging Center

There is a standardized message reminder for the processing of all initiated service items. If the applicant initiates a service application, the processor corresponding to the next approval phase will receive a message reminder of to-do immediately. After the approval result is submitted in this approval phase, the next approval phase will receive a message reminder of to-do immediately, and the applicant will also receive a message reminder of the event handling process immediately.

- Feedback Center

Through "I want feedback", teachers and students can feedback suggestions and opinions on all kinds of service items in the service hall and all aspects of the service hall. The university will continue to optimize the online service hall.

- Roast center

Through "I want to roast", we provide channels for teachers and students to roast about school, study, work, scientific research, life and other aspects. It supports comments and forms roast topic rankings according to the amount of comments.

- FAQ intelligent answering robot [7]

According to work experience, we sorted out the questions that teachers and students often consult, and settled in the FAQ library of intelligent answering robot. With the increase of user questions, the FAQ library will also be updated. The FAQ intelligent answering robot attached to the online service hall can effectively and quickly answer the common questions of teachers and students.

- Operation monitoring platform

It can accurately query and count the service items stationed in the online service hall according to various dimensions such as the category of service items,

the responsible department, the event process status and the event completion time, so that we can comprehensively grasp the overview of various service items used by teachers and students.

- Decision analysis service

Based on massive business process data and relevant basic data, thematic data analysis and decision support are provided to leaders through horizontal comparison, drilling conversion, trend prediction and other technical methods.

- Mobile terminal adaptation

Responsive web page development technology is adopted to adapt the terminal. The online service hall is integrated into the WeChat enterprise account of our university, so that teachers and students can view, apply, approve and handle affairs anytime and anywhere on mobile terminals such as mobile phones and pads.

### 3.2. Organization and Implementation Steps

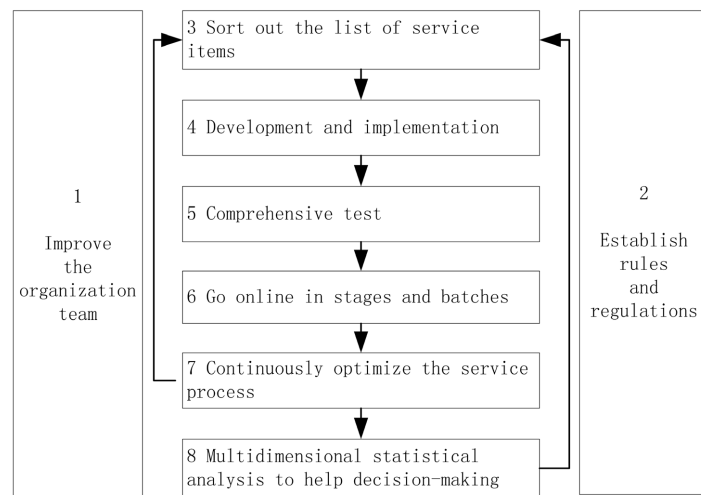
The organization and implementation steps of the online service hall are shown in **Figure 2**.

- Improve the organization team

The university leader in charge of informatization will act as the CIO, and the department of Information Network Center will take the lead to form an administrative document for the implementation of the online service hall and release it throughout the university.

Taking the construction of the online service hall as an opportunity, we will improve the informatization team covering all departments of the university.

The main principal of each department is the first person responsible for network security and informatization construction, a deputy leader shall be designated to be directly responsible for the coordination and promotion of the informatization construction of the department, and an information system



**Figure 2.** Organization and implementation steps of online service hall in colleges and universities.

administrator shall be designated to specifically handle the transactional work related to the informatization construction of the department.

- Establish rules and regulations

Standardize the rules and regulations related to the construction and operation and maintenance of the online service hall, clarify the rights and responsibilities of the information network center and each business department at each stage from the sorting of various service items, the development and testing of service items, the feedback and optimization of subsequent service items, and provide guarantee for the smooth implementation of the project and the coordination and cooperation between departments.

- Sort out the list of service items

First of all, we design the “Investigation Form of Online Service Hall”, which mainly includes the name of the event, the service target group, the main responsible department, the consulting telephone, the current form of handling the event, the current process of handling the event, the form to be filled in for the current event, whether to enter the online service hall, the form to enter the online service hall (newly customized or integrated with the existing business system), the optimized handling process, the forms to be filled in after optimization, and the auxiliary materials to be submitted after optimization.

All departments use “Investigation Form of Online Service Hall” as a template to sort out their existing service items for teachers and students. Summarize the list of service items sorted out by each department, and classify them according to the categories of educational administration and teaching, scientific research, asset finance, student affairs, life services, party mass services, IT services, and other services. At the same time, prioritize the items according to the importance, urgency of demand, output benefits and other factors, and divide them into three levels. The first level service items are firstly developed and implemented.

- Development and implementation

The online service hall platform is firstly integrated with the unified identity authentication platform of the university. Then we customize the service items according to the sorted service items list. For the service items that need to be handled in the original business system, they are integrated into the online service hall in the form of links. For the service items that need to be customized in the online service hall, they can be configured directly through the form editor, process engine, user center and other components in the service hall. For the service items that still need to be handled offline under special circumstances, they should also be stationed in the online service hall to facilitate teachers and students to inquire about the main responsible department, consultation telephone, handling procedures, relevant materials to be submitted and other information.

- Comprehensive test

All service items can be online only after passing the triple test of the test en-

gineer, information network center and relevant business departments. Each test needs to run the process completely for many times by initiating applications, filling in forms and subsequent approvals to ensure that the process operation, form information items and page prompts are correct [8].

- Go online in stages and batches

The online notification of service items is pushed through the information portal and WeChat enterprise account, and the service items are launched in batches.

- Continuously optimize the service process

According to the feedback from teachers, students and business departments during the online operation process, the service items were iteratively optimized.

- Multidimensional statistical analysis to help decision-making

For the service items settled in the online service hall, statistical analysis shall be carried out according to such dimensions and elements as the item category, item process, main responsible department, handling time, application amount, handling amount, completion rate, number of feedback questions from teachers and students, and the statistical analysis results shall be disclosed in the online service hall in real time, which can not only help the business department and leadership master the operation of all the affairs, but also promote the business department to improve working methods, optimize working processes and improve service efficiency.

## **4. Extended Application of Online Service Hall**

### **4.1. Self-service Printing Terminal**

There are some certification businesses in colleges and universities that need to be stamped in paper. The current implementation plan for this kind of business is to combine online and offline. The application and approval of certification are realized through the online service hall. The certification after approval is printed and sealed by the main responsible department, and then the applicant goes to the corresponding department to get it. Although this scheme has achieved the goal of “running at most once”, the time for the applicant to get the certificate is limited, and the work for the business department is still cumbersome. It can be improved by introducing self-service printing terminal equipment. Connect the online service hall platform with the self-service printing terminal equipment, the self-service printing terminal equipment reads the relevant data of the online service hall. The applicant can print the certificate on the self-service machine [9].

### **4.2. Electronic Signature Service**

With the development of informatization in different industries and the change of concept, electronic signatures are gradually accepted by people. For some certificates or documents that can replace offline seals with electronic signatures, the electronic signature service can be enabled. The university purchased a set of



electronic signature system, and made the official seal with many demands, wide coverage and high frequency into a legally effective electronic seal. This set of signature system can be integrated with multiple systems such as online service hall and cooperative office system, so as to achieve multiple uses of one set of signature system. For the service items that need to be sealed in the online service hall, the corresponding department shall affix the electronic signature at the last stage of online approval, and the applicant can download the valid evidentiary materials with the electronic signature.

## 5. Conclusions

The construction of the online service hall promotes the coordination and linkage of all departments of a university. It standardizes and optimizes all transaction processes and reasonably classifies relevant service items. The online service hall has become a unified entrance which provides the convenient and intelligent information services for teachers and students. Users can also directly search for the service items to be handled according to the keywords, greatly improving the efficiency of teachers and students in handling affairs. The records of online transactions, the operation monitoring platform and statistical analysis services provided by the online service hall provide data support for the functional departments and leadership to accurately grasp the operation of all affairs and make accurate decisions. In general, the construction of the online service hall is a big step forward from the digital campus to the smart campus, which marks another improvement of the university's informatization level.

In the future, we need to clarify the relationship between the online service hall and the information portal and the automated office system, and clarify which information services are suitable for the online service hall, which are suitable for the information portal, and which are suitable for the automated office system. It is also possible to consider a certain degree of integration between online office halls, information portals, and automated office systems. In addition, as a public application platform in colleges and universities, the online service hall also needs to provide interfaces for other public platforms and application systems in the digital campus, and its openness is also the focus of subsequent attention.

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## Conflicts of Interest

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

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