Analysis on the Construction of Chain Management Information Management System for 0-3 Year Old Infant Early Childhood Education Institutions Based on J2EE Technology

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Abstract

Based on J2EE technology, the SSH framework is used to complete the construction of the chain management information management system for infant early childhood education institutions. Aiming at the problems of incomplete management control, inconsistent system standards, bloated organizational structure, and low work efficiency in the chain operation and management of current 0-3-year-old infant early childhood education institutions, with the help of the application advantages of network information technology, online management Establish a reproducible standardized management system, quickly complete the deployment and implementation of relevant strategies and systems, flatten the vertical organizational structure, strengthen the interaction and application of information, improve the overall operational efficiency, and accelerate the chain operation of early education institutions. refined management and control. The system will completely simulate the operation process under the traditional management mode, and by setting subsystems suitable for users with different roles, to meet the different functional requirements of different users, and achieve the purpose of comprehensive management and control; the permission settings of different users also ensure the system The uniqueness and uniformity of management standards. The establishment and application of the system can realize the rapid expansion of the enterprise's strategic goals, maintain the enterprise's operating standards and core competitiveness effectively reflected, and further promote the process of enterprise management informatization construction and development.

Keywords: J2EE; early childhood education institutions; chain operation; informatization;

1. INTRODUCTION

With the gradual disappearance of my country's demographic dividend, the country has successively opened the two-child and third-child birth policies in 2016 and 2021 to greatly stimulate the growth of the newborn population. According to the data of the survey report, the total number of preschool children aged 0-6 in my country is about 110 million, and the annual number of newborns is about 10 million. Such a huge group base will bring huge market increment and space to the consumption of infants and young children. Since 2019, the state has listed infant care services as an important part of ensuring and improving people's livelihood, and the report of the 19th National Congress of the Communist Party of China requires that new progress be made continuously in "children's education", and various forms of infant care are encouraged. The rapid development of child care services, support social forces to set up child care service institutions. [8] From a policy point of view, the state is actively promoting the improvement of the preschool education system, solving the problem that the current kindergarten only accepts children aged 3-6, and meeting the current needs of childcare and early education for infants aged 0-3. At the same time, driven by factors such as the consumption upgrade of the infant early childhood education market and the Chinese people's emphasis on education investment, the infant early childhood

education industry with great development potential has been born. In the industry track, there are not only Chinese people, but also a large number of overseas brands, and the early education of infants aged 0-3 has gradually transitioned from the stage of free development to the stage of competitive development. The intensification of competition within the industry has accelerated the market share of enterprises and the rapid expansion of enterprise scale, which has prompted the business model of chain operation to become an important form of development of early childhood education institutions.

The chain operation is implemented in the mode of direct operation and franchising at the same time. Under the direct operation mode, the enterprise is the headquarters or an early education institution as the flagship store, and the branches are directly funded and have absolute control and operation rights over each branch. In the franchising mode, the leading enterprise or flagship store confers the marketing rights of self-developed commodities, trademarks, trade names, service technologies or business facilities within a certain area to franchised stores by entering into contracts to form a specific contractual relationship, and allow them to carry out marketing activities independently according to the contract, thus forming a business organization management model. [9] In the process of practical application, the two models have their own advantages in the application process, which reflects their replicability on the road of branding development of early childhood education for infants aged 0-3 years, and achieves the purpose of rapidly developing the market. However, certain problems have also been exposed. Under the direct sales model, the management and operation costs of branches are high, and talent training is more difficult; under the franchise model, management and control are difficult and the degree of unification and standardization is low. Therefore, this paper believes that, with the help of network information technology, the current J2EE architecture will be used to build a chain management information management system for early childhood education institutions for 0-3 years old infants and young children, aiming at the needs of different storefronts and users with different roles in the current various chain operation models. , to develop a comprehensive application solution. Promote the early childhood education institutions to get rid of the past management methods, ensure the smoothness and sharing of information at all levels, improve the processing speed of information, optimize the outflow of business operation management, further improve the operation of the enterprise, improve the management efficiency, and also promote the chain of infant early childhood education institutions. Manage the process of modernization.

2. INTRODUCTION OF KEY TECHNOLOGIES

2.1. Web Technology

Web is the abbreviation of World Wide Web, which is translated into World Wide Web in Chinese. It is a network information service system for publishing, browsing and querying information. Web is a typical distributed application structure, that is, a functional application system is organically formed by many system devices, and the problems of computing and storage that cannot be solved by a single device can be solved collaboratively. The Web includes two parts: the Web client and the Web server. The interaction and flow of data and information involved in each application of the Web requires the collaboration between the Web client and the Web server. The realization of the entire process depends on Hypertext. , Hypermedia (Hypermedia), Hypertext Transfer Protocol (HTTP).

From the rise of applications in the mid-1980s, to the official release of the Web project in 1991, to the current peak of development. Web technology has also experienced a development stage from static to dynamic, information interconnection to value interconnection. In the era of Web 1.0, web page production is the key content, and the type of web page is also a static web page that only supports the display of text and image content. [7] Since 2005, the Web is in the 2..0 era. The Web 2.0 era is dominated by users, emphasizing the interaction between users and system servers, making the Internet enter a more open, more interactive, and content co-construction stage of a readable and writable network. The technical complexity adopted in the Web2.0 era is far more complex than the Web1.0 era. More and more user demands are driving the update and iteration of Web technologies, which are divided into client-side applications according to the application design of the Web client and the programming development of the Web server. Technology and server technology.

2.1.1. Client Technology

Web client technology is also called front-end technology. The core technologies of its design and development are HTML, CSS and JavaScript, as shown in Figure 1. Among them, HTML refers to Hypertext Markup Language, a standard markup language used to create web pages. The HTML5 in the figure is the latest version, and its label semantics and enhancement of drawing functions can meet the special needs of current users. CSS is a cascading style, used to define the display rules of HTML elements, and CSS3 is also the latest version. JavaScript (js) is the programming language of the Web, which can modify the content of

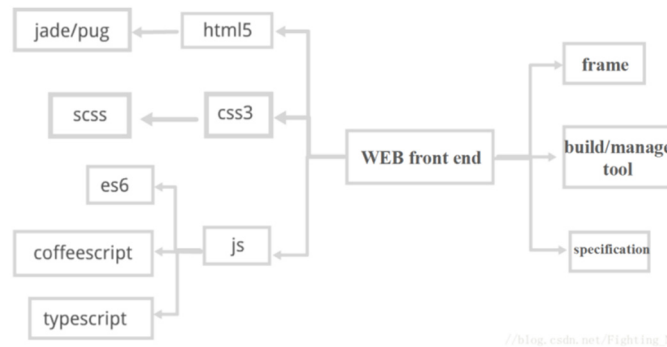HTML pages, increase page functions, and greatly improve user experience.

Figure 1: Basic technical architecture diagram of the web front end

2.1.2. Server-side Technology

Web client technology, also known as back-end technology, is the key to complete dynamic web design and development. The main content of the back-end technology is to interact with the database to process the corresponding business logic, that is, the process of creating a complete and runnable Web application server program. Developers can use a variety of object-oriented assembly languages and their derived frameworks, libraries and solutions to implement the core business logic of web applications, and provide specific APIs to make web applications efficient, safe and stable. to operate. [6] The separation of back-end technology and front-end technology can greatly improve the speed of system software development and effectively improve the quality of system design and development. As shown in Figure 2, it is the process of processing requests and responses for the back-end and front-end in the Java language environment. The design of the server side in the figure is more complicated than that of the front end, but there is no necessary correlation between the front end and the back end, and the two only rely on the call of the API data interface to complete the Http protocol communication.
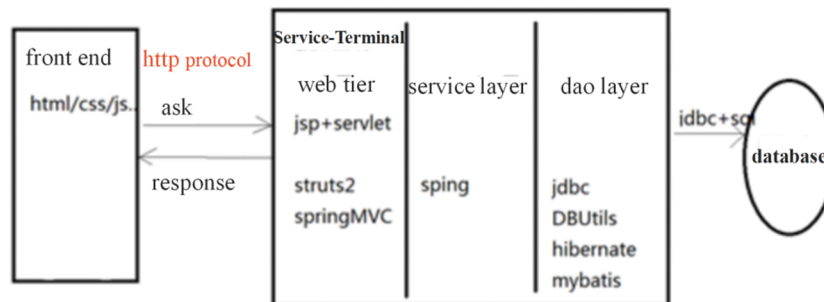

Figure 2: The process of client and server processing requests and responses

2.2. J2EE

J2EE is an architecture that utilizes the Java 2 platform to simplify complex issues related to the development, deployment, and management of enterprise solutions. It is an acronym for Java 2 Platform Enterprise Edition. As shown in Figure 3, J2Ee uses a multi-layer distributed application model. The application logic is divided into components according to functions, and each application component is distributed on different machines according to the layers they are in. [2] In the client layer, the application program supports two application modes of C/S or B/S to meet the various development needs of users. In the Web layer, the components supported by J2Ee are Jsp pages or Servlets. Both Jsp and Servlets can obtain requests from users in time, and forward the requests to Enterprise Beans on the business layer for processing. In the business layer, the Enterprise Bean component contains session beans, entity beans, and message-driven beans to represent temporal interactions between the business layer and the client layer. When the processing of the request information is completed, the result is sent to the EIS layer for storage, and the overall process can be executed in reverse. The EIS layer consists of a database to ensure the storage and invocation of system data information. The application of J2EE technology can provide the necessary functional support for the development of Web applications, and has significant advantages such as strong scalability, stable availability, efficient development, and easy maintenance.
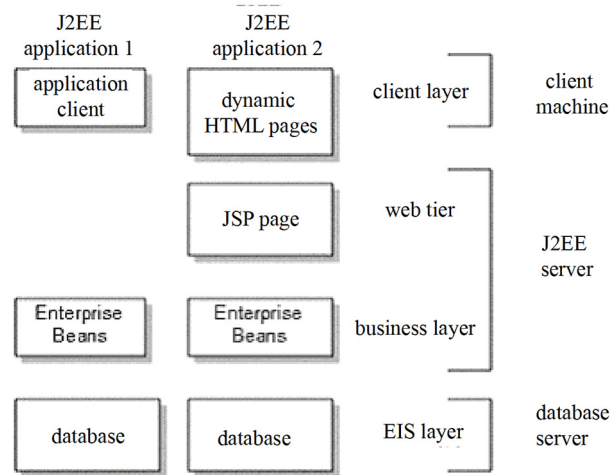
Figure 3: The distributed application model of J2EE

2.3. SSH Framework

The SSH framework is composed of Struts, Spring, and Hibernate. It adopts MVC (Model-View-Controller) mode to realize the hierarchical development of Web applications. The difference between SSH and J2EE is that J2EE is a standard, SSH is more technical, and SSH is a lightweight Web application development technology under the J2EE specification. application. [5] Among them, Struts2 is a framework based on the MVC pattern, responsible for the display layer, using JavaServlet and JSP technology to realize the process control of request processing, and calling the business layer to complete the operation logic, and the business layer then calls the persistence layer to complete the reading and writing of the database. The Hibernate framework is an object-relational mapping framework responsible for the persistence layer. It encapsulates JDBC in a lightweight way, so that Java programmers can use object programming thinking to implement database operations. Spring framework is a lightweight container framework, responsible for the middle business layer, its core is Inversion of Control (IoC) and Aspect Oriented (AOP). Spring's inversion of control can play a role in decoupling, so that Struts and Hibernate can be better combined and coordinated.

2.4. Development Environment

Complete the configuration and deployment of the development environment according to the system development requirements and the use requirements of the above-mentioned key technologies. The overall development of the system is based on the Linux operating system, the version is CentOS, the basic development environment is Java, the JDK version of the development kit is 1.8.0_91, the web server is Apache Tomcat 8.0, the Java integrated development tool is IntelliJ IDEA Ultimate, and the database is Oracle 11g. After the installation and configuration of the above software systems one by one, the establishment of the system development environment is completed. Under the IntelliJ IDEA system, create a new project and select Maven to create an existing Webapp template, where the Maven version is selected as Maven 3. Then set up a Java folder under the Main folder, and create the following package under Java. The overall deployment of the SSH framework requires Struts, Spring, and Hibernate to be completed separately. The Struts framework is built using the Struts-2.3.30-apps resource package; the Spring framework is built using the Spring-framework-4.2.2.RELEASE resource package; Hibernate framework is built. Select Hibernate-release-5.2.2.Final resource package. After introducing dependencies, adjusting the web.xml configuration file, and deploying and testing, the deployment of the three basic frameworks is completed. [1] As shown in Figure 4, it is the key code in the struts.xml file when the Struts2 framework is deployed, where <constant name="struts.action.extension" value="action,," /> means that the system matches all actions Requests are processed by struts2 to obtain the user's request, and call the access Action class to cause subsequent request processing operations. Through the introduction of the above key technical theories, the overall environment for system development, the configuration of related software and tools are determined, and the technical feasibility of the overall project of the chain management information management system for infant and early childhood education institutions is also clarified.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE struts PUBLIC
        "-//Apache Software Foundation//DTD Struts Configuration 2.0//EN"
        "http://struts.apache.org/dtds/struts-2.0.dtd">
<struts>
    <constant name="struts.action.extension" value="action,," />
    <constant name="struts.devMode" value="true" />
    <package name="default" extends="struts-default" namespace="/">
        <action name="test" class="com.well.liu.action.TestAction" method="test">

            <result name="test">test.jsp</result>
        </action>
    </package>
</struts>
```

Figure 4: The key code in the struts.xml file when the Struts2 framework is deployed

3. DEMAND ANALYSIS

3.1. System Requirements Analysis

The system developers will design a suitable chain management information management system according to the specific problems existing in the chain operation process of the current 0-3 year old infant early childhood education institutions, combined with the real needs of users at all levels of the enterprise, strengthen the internal functions of the enterprise, and organize The data and information in the organization are efficiently centralized and processed quickly, which improves the utilization rate and collaboration rate, promotes the reorganization of enterprise management and business processes, and promotes the flattening of the organizational structure and management mode of the enterprise organizational structure. [4]

The chain management information management system of 0-3 year old infant early childhood education institutions will support users of different levels and roles in the whole enterprise to complete the login and use of the system through account registration. Combined with the actual needs of the current system, the system will be set up with the headquarters (main store) manager, branch manager, teacher, customer service and other roles. At the same time, the system will formulate different subsystems according to the business processes and functional requirements of different roles to divide the authority levels of different user roles. Among them, the manager of the headquarters (main store) will have the main functions of data analysis, business reports, human information, course management, etc., aiming at unified management and control of all branches within the enterprise system. Branch managers have functions such as data analysis, business reports, and human information. While uploading and distributing enterprise management, they also take into account the internal management of each branch. Teacher users have functions such as course information, student management, feedback and

evaluation. It aims to provide information feedback and communication channels for the improvement of its own teaching business ability while realizing the auxiliary teaching function. The customer service users will involve student registration information, course reservation information, class scheduling information, sign-in information, leave information, etc., focusing on the control and management of various processes during the actual implementation of the 0-3 year old infant early childhood education course. The chain management information management system of infant and early childhood education institutions can carry out information management under the guidance of a relatively long-term business model setting, which always reflects the management system and business ideas of the enterprise, which can not only provide a clear direction for the enterprise management system, but also provide a clear direction for the enterprise management system. The management practice of the enterprise is invigorated.

3.2. Overall Design

The chain management information management system of the infant early childhood education institution will adopt the B/S structure, under the J2EE technical specification, using the JavaWeb application development technology as the foundation, and combining the SSH framework to complete the overall design and development of the system according to the MVC model. The SSH framework is developed using the characteristics of the MVC model. The SSH framework set is a framework set that is used in most software design processes, and has become a common pattern in modern J2EE development. [3] Under the SSH framework, the bean layer corresponds to the control layer of MVC; the dao layer and Hibernate complete database management, corresponding to the model layer of MVC; the servlet layer and the jsp display layer, corresponding to the view function of MVC, as shown in Figure 5 for the system Overall architecture diagram.
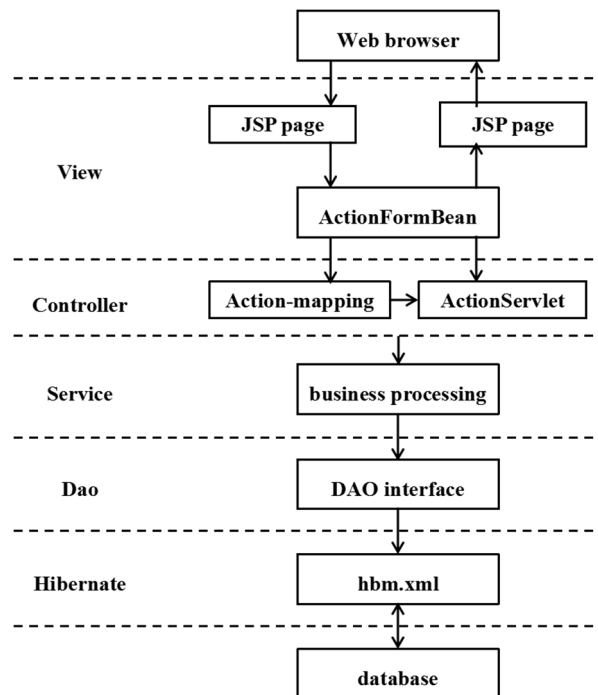
Figure 5: Overall system architecture diagram

4. DETAILED FUNCTION IMPLEMENTATION

4.1. Headquarters (Main Store) Manager

In the chain operation information management system, the headquarter (main store) manager, as the strategic layer of the enterprise, needs to be responsible for the planning, management and control of the chain operation of 0-3 year old infant early childhood education institutions. Accordingly, the chain management information management system can be divided into three parts: management information, data support and decision support.

In the management information part, the system will focus on the refined management of high standards and strict requirements for the teaching staff and curriculum system in the process of early childhood education for infants aged 0-3. In the system function page, the manager of the headquarters (main store) can view the basic information, work history, rewards and punishments and other detailed information of all in-service teachers in the company, so as to keep abreast of the company's human resources information and provide necessary data for subsequent talent flow management. Information support. In addition, the management information also includes the entire content of the current 0-3 year old early childhood education course information. Under the construction of the curriculum system, there are standard courses and special courses. According to the theory of physical and mental development of infants aged 0-3, the standard courses are divided into 7-12 months, 13-24 months and 25-36 months. Paragraph three parts. The standard curriculum

in the 7-12 month age group includes: basic gross motor, fine motor, sensory cognition, language perception and interaction; in the 13-24 month age group, the standard curriculum includes: cognitive ability improvement, memory training, exercise Ability training, language communication ability training, social life ability training; and the standard curriculum for the 25-36 month age group includes fine motor training, coherent language expression, emotional adjustment, and habitual rule training. Special courses include performance, musical instruments, natural science, sports, painting and other related courses, which provide necessary guidance for the implementation of early education courses.

The data support part includes a single report or a consolidated report including the financial data report and business details report of the entire enterprise and a single branch. In addition, under the data analysis function, the system can perform statistics and analysis on the business data information of the entire enterprise or a single branch under different conditions according to the key fields set by the user, such as the historical growth rate analysis of business conditions over the same period, revenue Capability comparative analysis, ROI comparative analysis, payback period analysis. Accurate data analysis results can intuitively reflect the development status of the enterprise and whether the manager's management path is feasible, and it is also an important criterion to measure whether the chain operation and management of infant early childhood education institutions is reasonable. Relying on the data support of the system, enterprise managers can grasp the laws of the market economy in a timely manner in terms of enterprise operation decision-making and

management control, obtain enterprise operation and development trends, and make relevant enterprise decisions and development plans more objectively, so as to achieve a more scientific and orderly operation.

4.2. Customer Service

Under the customer service subsystem, after logging in, customer service users will have functions such as student registration information, course reservation information, course scheduling information, sign-in information, and leave information. Under the student registration information, the customer service can directly view, add, modify, delete, save and other operations on the personal information and parent information of the registered students, and form the corresponding data information table and store it in the system database. When the customer arrives at the point or makes a course reservation by other means, it will help the customer complete the course reservation under the system according to the established course scheduling information table. Under the sign-in information, the sign-in confirmation will be carried out according to the reservation situation of each course. When the customer cannot attend on time, he can complete the operations such as requesting leave and canceling the reservation according to the prescribed procedures of the system. With the help of the system, it can complete daily work more conveniently, reduce errors caused by human errors, and improve work efficiency. It has also become an important data acquisition point for the system, providing support for subsequent data analysis, management, and decision-making.

4.3. Teacher

Under the teacher subsystem, teacher users have functional modules such as course information, student management, and feedback evaluation. The course information includes the time, place, course plan, course details, required teaching aids, reserved student information, etc. for the course arrangement. It is convenient for teachers to complete lesson preparation work in advance, improve the efficiency of curriculum implementation, enhance teaching effect, and achieve the purpose of auxiliary teaching. Under the student management function, you can obtain the detailed information of the students participating in the course, including some teaching evaluations, student growth information, etc. In the feedback evaluation, there are students and parents' feedback on the course content and teaching effect, as well as the evaluation of teachers' colleagues and department leaders. So that teachers can comprehensively understand themselves from multiple perspectives, improve their professional ability, and enhance their comprehensive quality.

5. CONCLUSIONS

The construction of the chain management information management system can provide comprehensive and applicable solutions for the shortcomings of the current chain management of 0-3 year old infant early childhood education institutions. With the help of various advantages of network information technology, it meets the actual work needs of users at different levels and roles of the whole enterprise with rich functions, strengthens the interaction and application of information, improves the overall operation efficiency, and realizes the chain operation of early education institutions at a growth rate. The refined management and control of the company further consolidates the core competitiveness of the enterprise in the field of early education industry. While ensuring a more stable, sustainable and healthy development of the enterprise, it also promotes the process of enterprise management informatization construction and development.

APPENDIX

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