Research Article
An Optimization Model of English Teaching Resources Based on Distributed SOA

Juan Du, 1 Hongping Wang, 2 Ping Du, 3 and Hongping Chen 1

1 Department of Foreign Languages, Nanchong Vocational and Technical College, Nanchong 637131, Sichuan, China
2 Department of Electronic Information Engineering, Nanchong Vocational and Technical College, Nanchong 637131, Sichuan, China
3 School of Foreign Languages, West China Normal University, Nanchong 637002, Sichuan, China

Correspondence should be addressed to Ping Du; dping64@cwnu.edu.cn

Received 20 April 2022; Revised 17 May 2022; Accepted 18 May 2022; Published 7 July 2022

Academic Editor: Liping Zhang

Copyright © 2022 Juan Du et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

As a result of the growth and development of digital education, many educational resources have appeared on the Internet. On the other hand, these educational resources are scattered, unorganized, duplicated, isolated, and closed. Based on a detailed study of the characteristics and design ideas of SOA software system architecture, this paper develops an integrated and optimized system of English teaching resources based on SOA. SOA is a new service model for sharing and integrating educational resources from disparate sources that is characterized by loose coupling, platform independence, interoperability, and openness. This paper explains the system’s overall structural framework and design flow. It also explains how each layer structure’s function is realized through technology and process. Different service interfaces are used to realize various system functions, and an abstract service interface is left for future system expansion, allowing the system to be reused as much as possible. The system proposed in this paper is an open sharing platform for educational resources that has unified standards and rich content, greatly improving the situation of previously isolated educational information resources.

1. Introduction

With the advent of the information, digitalization, and networking era, information is spreading at an ever-increasing rate, and the concept of time and space is becoming increasingly distorted. The information age has posed a challenge to traditional college English teaching methods [1]. The scope of obtaining college English teaching resources has greatly expanded as a result of the information environment and is no longer limited to teaching resources in schools and in China but can now be extended globally. The abundance of teaching resources also encourages teaching mode innovation [2]. The teaching resource database provides users with convenient and quick access to resources, provides resource feedback and evaluation for teaching managers, and serves as a foundation for improving the utilization rate of teaching resources and the development of educational informatization by storing and managing all types of teaching resources. In terms of teaching resource integration and optimization, digitalization of teaching resources in an information environment is easier to integrate than written materials such as books, newspapers, and periodicals, which is beneficial for resource allocation [3]. With the rapid development of digital education, online resources are rapidly expanding and exhibiting distribution, heterogeneity, and mass characteristics [4]. The underlying structures and functional interfaces of various educational resource systems are inconsistent due to the complexity of technology, the diversity of education, and the nonstandard process of resource development, making it difficult to effectively communicate and integrate digital educational resources [5]. At present, the imbalance of resource allocation among colleges and universities and the lack of overall planning are important problems in the allocation of English teaching resources. With the inclination of regional resources and national policies, there are serious differences among colleges and universities, especially uneven development.
Various Internet-based emerging technologies are exploding, and information technology is playing an increasingly important role in the development of English teaching resources. The product of digitalization of teaching media is digital teaching resources [6]. People gradually shift their research focus away from teaching media and toward teaching resources as their understanding of the essence of the teaching process grows. Educational resources are at the heart of educational informatization’s development, as well as one of its bottlenecks [7]. The English teaching model based on the network environment has largely taken shape as a result of continuous exploration and practice. Universities have built and improved information-based and networked digital campuses [8], as well as multimedia classrooms, network autonomous learning rooms, and teaching resource banks. All of this has created a brand-new platform for college English teaching and ensured that the quality of college English instruction will continue to improve. However, due to the heterogeneity and close coupling of development tools and platforms, educational resource sharing and integration in colleges and universities is limited [9]. Creating a teaching resource library with unified standards, loose coupling, cross-platform, reusability, and expandability can help not only solve the current problem of a teaching resource information island, but also ensure future system expansion [10]. The above requirements can be met by using a teaching resource base built on Service-Oriented Architecture (SOA). It is a business integration software system architecture for the SOA network. It is widely used because of its strong coupling, reusability of services, and platform independence [11]. To realize the integration and optimization of English teaching resources, this paper designs a teaching resource library based on SOA.

In order to improve the efficiency of college English teaching, deeper education reform and solving the problem of integrating and sharing college English teaching resources under the information environment are critical [12, 13]. At the same time, there are no uniform standards, making it difficult to fully guarantee resource integration services’ order, refinement, and optimization. As a result, a flexible and advanced integration and optimization system for teaching resources is required. A service platform for integrating various current online educational resources is an educational resource management system [11]. It brings disparate educational resources together and processes them to make them more orderly, standardized, and interconnected. The educational resource management system increases the efficiency of educational resource use while also promoting the growth and advancement of digital education. SOA offers a fresh approach to addressing issues such as platform construction, resource integration, sharing, and service. This paper uses SOA to design and implement an integrated and optimized system of English teaching resources based on the actual project requirements. This paper examines the computer basic teaching base’s software resources, divides existing software into appropriate service granularity for encapsulation according to different user requirements, and employs the designed five-layer structure framework to realize software resource reuse and integration. SOA-based teaching resource library realizes the binding of database and XML file. Make the data between different platforms and databases form extensible XML language through data mapping, and make the data interaction between heterogeneous databases possible.

2. Related Work

Literature [14] holds that the problems of lack of overall planning among colleges and universities and imbalanced allocation of college English teaching resources can be solved through cooperation among colleges and universities and strengthening resource sharing. Literature [15] points out that the integration and allocation of English teaching resources in many public websites are updated by teachers or related experts. However, due to the time cost and vision problems of teachers and experts, it does not fit with the setting of teaching resources and the actual situation of students, and the pertinence is weak. Literature [11, 16] holds that the gap of English teachers in colleges and universities, as well as the different emphasis on the informationization of college English teaching resources, also leads to the gap in the quality of college resources. Moreover, the system of English teaching resource pool in different universities is also different, which makes it difficult to retrieve resources. Literature [17] pointed out that the construction of resource management system based on SOA is the key to solve related problems such as resource integration, integration, and sharing. Literature [18] pointed out that the Internet has gradually become one of the important channels for students to obtain English learning resources after class. Schools should seize the new opportunities of English teaching development, dig deep into the relevance between the Internet and English teaching resources, actively create new English teaching methods, and positively guide students to have a good English class. Literature [19] suggests that the benign integration of English teaching resources can help teachers to establish a multidimensional, three-dimensional, and complete teaching system and promote students to quickly absorb the knowledge learned in class. Literature [20] refers to the composition of service-oriented enterprise framework, improves the three-tier framework by using business process management technology, and designs a five-tier framework based on SOA. Literature [21] has completed the functional structure and service architecture design of educational resource management system based on SOA. Literature [22] analyzes the current situation of the construction of teaching resource database at home and abroad and deeply studies LOM standard, CELTS standard, SOA architecture, and Web services. Literature [23] introduces Web service technology into the development process of educational resource sharing system. By designing the corresponding intermediate application components to access the heterogeneous teaching resource database, the problem of accessing the scattered and isolated heterogeneous resource databases in colleges and universities is solved. Literature [24] combines specific projects and integrates the idea of SOA architecture with educational resource management system. Through the service component
architecture and the use of service data objects, the service integration design and implementation are carried out for the network education resource management system and give an example of specific Web service invocation. Literature [25] studies the application scheme of SOA in educational resource management system in detail. Starting from the idea of SOA architecture, this paper puts forward a five-tier framework model based on SOA and gives a detailed example of the business process of the system.

In the basic computer teaching base, there are numerous computer software systems stored in various server locations with various architectures. Based on an in-depth review of related literature, this paper proposes a SOA-based integration and optimization system for English teaching resources in order to reuse and integrate these heterogeneous resources. The business of the system is modeled using the characteristics of SOA-oriented architecture combined with the user business requirements of a resource management system. Finally, the hierarchical architecture and system service framework of the system are designed, as well as the service architecture of the resource management system based on SOA. The system can hide the location and architecture of the underlying software system from users, provide a unified client, and allow the new system’s design and use to evolve independently of the original system. Perfect encapsulation, symbolic protocol specification, and high integration, as well as a clear and reasonable system structure and strong scalability, are all features.

3. Methodology

3.1. Integration and Optimization of English Teaching Resources. The benefits of using multimedia network technology [26, 27] to aid English teaching are becoming increasingly apparent. Colleges and universities should maximise the benefits of information resources, improve resource integration within colleges and universities through multangle resource presentation, integrate college English classrooms with teaching resources, expand students after class, and integrate training resources. These two resources are both centred on college English courses, but their emphasis is different. As a result, colleges and universities must conduct an in-depth and comprehensive analysis of teaching materials to ensure that every knowledge point is repeated and reinforced. According to their learning characteristics, curriculum resources should be expanded and integrated.

Simultaneously, strengthen the teaching staff, professional team, and management team to ensure resource integration and sharing; in the information age, the majority of students must actively participate, constantly improve their information learning ability, and establish a learner-centred teaching model. Due to the large number of resources available on the Internet, resources appropriate for college English teaching must be closely linked to teaching materials, particularly vocabulary, which must be checked and screened using standard resources. Furthermore, there are an abundance of English materials on the Internet, necessitating English teachers’ observation and guidance of students’ psychology, emotions, and needs, as well as respecting students’ personality differences and guiding students to discover their true interests, talents, and things they are good at. Assist students in locating appropriate auxiliary English learning materials and guiding them toward the ability to freely use English resources on the Internet. The framework model of the integration and optimization of English teaching resources based on SOA is shown in Figure 1.

Teachers in the information-rich multimedia network era should be able to not only use multimedia network information technology, but also master strategies for dealing with teaching programmes, so that students are always fresh and teaching is unconventional. Multimedia network teaching is both a new teaching method and a new teacher evaluation tool. Teachers should try to use the data from Internet search engines and big data analytics platforms to find as many appropriate learning materials as possible. We should also assess each student’s English proficiency, interests, and personality. To achieve “one-to-one” personalised English teaching and training, make an organic match between the two. Schools and teachers should consciously use the Internet as a breakthrough to broaden and deepen the scope of English teaching.

Unified standards are an unavoidable requirement in the integration of college English teaching resources in order to expedite the process. At the moment, colleges and universities’ information resources platforms use a variety of systems that can only be used expertly by campus insiders, making it difficult for teachers and students to obtain teaching resources and managers to comprehend them. Simultaneously, standard differences in resource retrieval tools reduce resource utilization efficiency. As a result, unification of standards is necessary. This necessitates the creation, integration, and sharing of all types of resources according to unified standards, as well as the realization of seamless, unified, and comprehensive links among resources, as well as the construction of a structural system with the exchange of needed goods, complementary advantages, and balanced resources, in order to maximise resource efficiency and overall benefits and embody the people-oriented service concept.

Multimedia educational technology creates conditions for creating a constructivism-based learning environment and improving students’ English learning ability. Language learning, according to constructivism theory, is a process in which students construct their own understanding of the target language. Teachers are the organisers of teaching practice and the helpers of semantic construction. It is a language communication tool. Language is required for communication in a variety of situations and fields, so it is important to learn it. Teaching can overcome many obstacles and even happen naturally if we can find language communication content that students enjoy.

3.2. SOA Architecture. SOA is a kind of architecture based on service-oriented concept. The interface of the service is encapsulated as a component in a neutral way, independent of the running environment and programming language in
the system. Traditional systems can be well integrated through these service modules. SOA can be understood as the upgrade and development of object-oriented analysis and design, which redeploys and combines the services or components provided by the system according to the different needs of users. The object-oriented system, encapsulation, binding, transfer, description, and query are the basic concepts in SOA. SOA is to replace the functional modules in traditional large-scale applications with the concept of functional services, and these replaced modules will be linked by good interfaces and contracts defined between services. At present, many enterprise application systems are systems provided by different software providers. There are many heterogeneities among these systems, and many system modules cannot operate with each other or even share data, which largely results in resource waste and functional redundancy. The architecture based on the service concept can easily reconstruct the modules with similar functions among these heterogeneous systems in the form of service modules, thus realizing mutual sharing among heterogeneous platforms and greatly improving the utilization efficiency of resources.

SOA is a coarse-grained and loosely coupled system construction method. Its architecture is characterized by loose coupling, business-oriented, transparent architecture, platform compatibility, and service security. In the SOA architecture, the service layer is the most basic part, which controls the interaction between the system and the proxy components by calling and applying services. Service is defined as follows: the service provider completes a set of tasks and delivers the required final results for the service consumers. Through concrete combination and deployment, these services form service entities, which provide and consume services for users through a series of service terms and contracts, through publication, registration, and delivery. There is no mutual call between services, and the services run independently of each other, which will not have any influence on other running services. At the same time, when some services are managed, other services can still be open to users. This feature enables the architecture to continuously and dynamically expand existing services, thus greatly improving the maintainability and flexibility of the system. By analyzing the interaction between services, SOA can help application systems know when and why business logic is actually executed, which enables administrators or analysts to optimize business processes in a targeted manner.

SOA architecture is an intermediary service agent. The service call process is shown in Figure 2.

One of the great advantages of SOA is its loose coupling, which can be embodied in the fact that the traditional system can be directly encapsulated into service use without modification, so this is the credit of service contract. It should do three things: ① Grasp the essence of services provided by traditional systems. ② There is a reference between the newly defined service contract and the traditional system during encapsulation. ③ Do not expose the type system of the implementation language. In an enterprise architecture design, it should be done that the service contract is independent of any individual service implementation, and the service contract should be defined and managed separately. SOA encapsulates the service information provided to users and makes some parameters such as service provider information, service location information, service invocation parameters, service agreement
binding parameters, service release time, service update time, and so on transparent to users. Users only need to input the service parameter information to the relevant service to complete the call to the service.

3.3. Design of Teaching Resources Integration System Based on SOA. When designing the system structure, everything starts from the service point of view, considering the service requirements first and then assembling the system services. The whole software process is divided into service definition, description, release, discovery, binding, service arrangement, business logic design, and call execution. Security includes several aspects, mainly including data security, reliable transmission, permission security, and so on. All services are maintained in a list in the form of directory, and services are managed effectively. In terms of service management strategy, the security factors of services are fully considered. The maintenance of these security aspects is based on the transparency of users, so users do not need to face much complicated security parameter information.

For resource pool and resource management system, using SOA architecture can take different resource pool and management as service nodes, use Web service technology to form a unified service interface, and then provide a unified resource management service portal through SOA, which can maximise the resource utilization efficiency and provide better resources. The reusability of services can greatly reduce the construction cost of resource pool. Reuse is beneficial to protect users’ early information investment. In the process of construction, the service can only be run in the context of a specific process, or the logic can be distributed in different services to ensure the realization of service reuse. Teaching resource influencer set is a multiset, which can be simply expressed as

\[
f = \sum_{i \in I} f(1)I.
\]

Among them, \( f \) represents the set of resource influencers, \( L \) represents the total number of students’ influence ability levels, and \( J \) represents the influence ability level. \( f(1) \in IN_0 \) represents the number of resource influencers whose influence ability level is \( I \). In the same way, the teaching material at this time can also be regarded as a multiple set from the perspective of different difficulty.

The cosine correlation is calculated between the document feature vector \( R \) of the new teaching resource and the comprehensive user interest vector \( U \). The larger the cosine value, the greater the correlation \( \text{Sim}(U, R) \), and vice versa, calculated as follows:

\[
\text{Sim}(U, R) = \frac{\sum_{k=1}^{n} (u_k \times r_k)}{\sqrt{\sum_{k=1}^{n} u_k^2} \times \sqrt{\sum_{k=1}^{n} r_k^2}}
\]

After the SOA service is set up, heterogeneous resource systems of various standards can be realized by registering SOA services in the same resource service via a unified Web service interface, allowing users to access unified resource services. Different educational resource providers have varying degrees of control. Even if each integrated resource system’s access policies are correctly defined, the interaction between them can lead to conflicts and inconsistencies in system behaviour throughout the life cycle of a collaborative session of digital educational resources. The security integration framework must adapt to the dynamic characteristics of service resource integration, ensure system consistency, and ensure the resource integration system’s robustness and reliability.

It is assumed that all learning resources have unique identifiers. The collection of learning resources is recorded as \( \text{LO} \):

\[
\text{LO} = \{ l_0 | 1 \leq i \leq M \}.
\]

The node community \( i \) (denoted as \( C_i \)) is the set of nodes that conform to the community rule \( r_i \), which is

\[
C_i = \{ p_j | p_j \in P, p_\text{Belong_to_C}(p_j, r_i) = \text{TRUE} \}.
\]

At the same time, the domain or category description and community classification of the object meet the following requirements:

\[
\forall l_0, i \in \text{LO}, \exists r_j, l_0 \text{Belong_to_C}(l_0, r_j) = \text{TRUE}.
\]
services resources are aggregated together. When new technologies need to be deployed or added, there is no need to modify the existing security framework to achieve scalable access and integration. User interaction process design is mainly embodied in the design of interface to be input and the basic verification of the integrity and validity of user interaction data, such as input box, drop-down list, table, form, etc. Another important task is to check the integrity and validity of interactive data. Users do not need to know whether the resources in the resource pool meet the unified standards, and managers do not need to know the management modes of different resource pools. As long as the resource access and management services registered on SOA are used, different heterogeneous resource pools can be accessed and managed, so as to realize the integration and sharing of various teaching resources.

The TextRank model can be represented as a directed weighted graph \( G = (V, E) \). In the graph, the edge weight between any two points \( V_i \) and \( V_j \) is \( w_{ij} \), and \( \text{In}(V_i) \) is the set of points pointing to the point \( V_i \). \( \text{Out}(V_i) \) is the set of points pointed to by point \( V_i \). The TextRank value of point \( V_i \) is defined as follows:

\[
WS(V_i) = (1 - d) + d \sum_{V_j \in \text{Out}(V_i)} \frac{w_{ji}}{\sum_{V_k \in \text{Out}(V_j)} w_{kj}} \tag{6}
\]

where \( d \) is the damping coefficient, which represents the probability of pointing from any specified point in the figure to other points, and the value is 0.86 in practice. After several iterations of TextRank, the error rate reaches convergence when the error rate is less than a certain value, and the importance of each point is obtained.

The system provides different user interfaces for each type of role users. First, the message request sent by the user is encapsulated into a general SOAP message after being parsed by the internal service of the system and then sent to the local Web service agent. The agent returns the final processing result to the client, which can realize the separation of data access and data execution, achieve the rapid response of various business processes, and meet the needs of cross-platform business integration in different environments. The design of various services in the system is realized by Web service. For the sake of simplicity, here, only the access control service is taken as an example to introduce its specific design.

The model judging rate and root mean square error index are used to check the modeling effect of the model. The formula for calculating the model accuracy index is shown in formula (3).

\[
\text{PMR} = \frac{\sum_{i=1}^{M} \sum_{l=1}^{N} I^{(l)}( \widehat{\alpha}_l = \alpha_l )}{T \cdot M} \tag{7}
\]

Among them, \( I^{(l)}( \alpha_l = \widehat{\alpha}_l ) \) indicates whether the \( \widehat{\alpha}_l \) estimated in the \( t \)-th experiment is exactly the same as the real value \( \alpha_l \). If they are the same, the value of \( I^{(l)}( \alpha_l = \widehat{\alpha}_l ) \) is 1; otherwise the value of \( I^{(l)}( \alpha_l = \widehat{\alpha}_l ) \) is 0. The formula for calculating the root mean square error indicator is shown in formula (4).

\[
\text{RMSE} = \sqrt{\frac{\sum_{i=1}^{M} \sum_{l=1}^{N} \sum_{j=1}^{2^k} [ P^{(l)}( r_j | \alpha_l ) - \hat{P}^{(l)}( r_j | \widehat{\alpha}_l ) ]^2 }{2^k \cdot T \cdot M}} \tag{8}
\]

Among them, \( P^{(l)}( r_j | \alpha_l ) \) and \( \hat{P}^{(l)}( r_j | \alpha_l ) \) represent the probability that the \( t \)-th experimental estimate and the real attribute model \( \alpha_l \) score \( r \) in the \( j \)-th question, respectively. If the PMR value is larger and the RMSE value is smaller, it means that the estimated value is closer to the real value; that is, the smaller the error is, the better the modeling algorithm is.

In the system application of teaching resource library, business logic is the control of object state change between business objects. In essence, business can be said to be the abstraction of the control system that solves the three problems of calculation method, constraint conditions, and transition state. We usually package business rules into components, which has achieved the greatest reusability. The resource access control service is designed by defining the user’s access requirement function, without considering the internal implementation in detail, which greatly reduces the user’s intervention on the underlying implementation and can provide more space for designers to freely play. At the same time, focusing the design on the service department can better grasp the users’ needs and conduct demand analysis for use.

### 4. Result Analysis and Discussion

Traditional systems, such as computer examination systems, computer-aided teaching platforms, distance education, and resource databases, are mostly used in this system. These four systems are completely different in terms of computer architecture, servers, and databases. A relationship in a relational database corresponds to a two-dimensional table in the data. When a relational database is modeled, it can be thought of as a collection of many two-dimensional tables. There are currently two data mapping methods: model-driven mapping and template-driven mapping. We use the latter for data mapping due to the unique situation of the teaching resource library.

The encapsulated system is thoroughly examined, and the data type and content of the design message should refer to the service’s accepted input message, the response’s output message, and the completed business activities. The presentation layer is a layer that is visible to users and can provide them with user-friendly interactive interfaces and portal integration features. Note that the presentation layer
is only responsible for sending requests and returning results, and any changes to it will not affect the other layers. In addition, the presentation layer must check some basic data, such as whether the input data meets the requirements. Create new business process services to meet the demands of users’ time-consuming tasks. The new service is primarily used to design the business process, query the service contract of the transferred service that must be used in the business process, and design the transferred service’s message type. In this paper, experiments are carried out, and the influence of control parameters on the model integration optimization effect is shown in Figures 3 and 4.

It can be seen from Figure 4 that, regardless of the proportion of the test data set and whether the teaching resources are simple or complex, with the gradual increase of the control parameter values, the $F_1$ value of the model integration optimization algorithm shows a trend of first increasing and then slowly decreasing. The client is the service consumer, that is, the user layer. In this system, service users are divided into three types: teacher users, student users, and off-campus users. They use the same or different services, and this system provides different service choices for different types of users. Before creating the service, you should set up the business entity, including the
primary key of the business entity created earlier, and at the same time, you should set up the binding template and the access point to access the service. Then create the description details of the set service interface instance and include the service interface primary key. This service interface description details include document description, etc. Finally, you need to set the service interface to the binding template and set the binding template to the business entity. After querying the existing services, divide the service granularity according to users’ needs. If the existing services cannot meet users’ needs, new services need to be designed. Then, design your own service contract for each service, and encapsulate the service. After encapsulation, you can register the service for the service requester to query. In this paper, many experiments are carried out, and the error of this algorithm is obtained, as shown in Figure 5.

The error of the algorithm in this paper has been relatively stable over many experiments, and the error remains within a small range. The service composition and business process are designed to provide reusability, provide users with complex business process work, and reduce users’ workload. The system creates various service combinations and processes based on the needs of users. The data layer primarily provides the data that the system requires and manages the system’s data, which includes data classification, organisation, storage, coding, retrieval, and maintenance, among other things. The data layer connects tasks to the database, while the data access interface connects various services to the presentation layer and business logic layer. The transaction management module realizes adaptive resource coordination, rolls back or continues transactions within the users’ acceptable cost range, and ensures the integrity and reliability of resource integration applications. The process management module is used to optimize resource integration application and to achieve the matching, execution, coordination, and update of target process instances. Many experiments are carried out to verify the accuracy of the algorithm in this paper, with the results shown in Figure 6.

It can be seen that the accuracy of this algorithm has been kept at a high level, and it has certain stability and practicability. Take student users taking online exams as an example. The whole business process is as follows: firstly, the information of student users that need to be added is collected, and the information of teacher users is added to the student information database. After the addition is successful, add the information to the exam courses that students need to take. After these two steps are completed, students can take the exam. In order to verify the feasibility and superiority of the method proposed in this paper, we selected the resource integration methods of [23] and [24] to make a comparative experiment with this method and obtained the following results.

From the trend in Figure 7, it can be seen that the resource integration and optimization efficiency of [23] and [24] is low, and the integration and optimization efficiency of this method remains at a high level. It shows that this method is superior to other methods. The requester has its own internal data model, which is used to implement its internal business logic. When a service requester wants to call a service, it must construct a service request that conforms to the service contract. Policy-based collaborative management solves the problem of effective collaboration of multiple security mechanisms from the perspective of autonomous service resources. By integrating the consistent detection of resource access control policies, the integrity constraint check and conflict discovery of autonomous resource security access rules are carried out. When there is a conflict between the access control policies of the integrated resources, the model extracts the inconsistent rules of the
access control policies that affect the resource integration and eliminates them through the trusted derivation of the access control policies. Realize the resolution of conflicts between policies and ensure the consistent integration of resources across security domains.

In order to strengthen the sharing of teaching resources and improve the situation of isolated teaching resources, the resource construction of teaching resource pool should meet the standards. In order to make the resource database have good scalability, the data table in the data resource database refers to LOM standard. According to the data demand analysis of the resource database, the resource data information in the system database is mainly realized by connecting four data tables. ① Resource basic information table. ② User information table. ③ Resource statistics table. ④ Resource feedback table. Each part contains several schedules, which can be accessed to realize the calling function of resource data. With the support of the security policy database of educational service resources, the policy coordination management module judges the consistency of the security policies of autonomous resources. During the system test, each functional module
runs well and can realize business functions such as user management, courseware management, courseware query, and courseware statistics.

5. Conclusions

English teaching needs to be reformed more deeply in this information age. To aid in the development of English teaching, the government and universities should encourage the integration of information technology into college English courses, dig deep into rich teaching resources, and create a fully functional intelligent platform for collecting, producing, integrating, searching, using, publishing, and sharing teaching resources. To begin, this study discusses the subject’s background and importance, as well as the research objectives and contents. The content of English teaching resource integration and optimization is then discussed in depth. The feasibility and necessity of teaching resource base construction based on SOA are discussed in this paper, followed by a detailed introduction to the resource base construction specification and the SOA concept. Also, using SOA, design and implement an English teaching resource integration and optimization system.

Heterogeneous systems are integrated into a new system without changing the tradition, providing users with a unified client and shielding the implementation details of the underlying system, thanks to research into the combination of SOA and teaching resource library. The underlying system evolves independently of the new system, and the underlying system can be modified concurrently with the new system’s establishment, leaving an abstract service interface for future use. The base system’s reuse can be improved as much as possible, and users can complete complex business processes. The findings show that this system is capable of meeting the requirements for integrating software system resources into a computer basic teaching base and how the new theory opens up new avenues and methods for the development and application of teaching resource databases in the future, as well as providing preliminary experience for the widespread application of SOA theory in various information systems. However, due to a lack of research time and resources, the developed system is bound to have flaws, and it requires further development and improvement. The next step will be to improve the system’s performance after assembly and conduct a fine-grained assessment of the consistency of application-level authorization constraints for the integration of educational service resources, in order to improve the security integration of educational service resources.

Data Availability

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

Conflicts of Interest

The authors do not have any possible conflicts of interest.

References

Mobile Information Systems


