

Design and Implementation of an Arabic Learning Website

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Abstract. With the rapid development of online learning platforms, the research and application of Arabic learning aids has become an important topic to meet the needs of learners and enhance learning effects. In this paper, during the advancement of the project, the user's learning needs are met through the functions of material query and download, teachers can upload courseware and teaching videos, and administrators are responsible for the management of users, courses and orders. The functional requirements and operational requirements of the system are clearly defined, on which a comprehensive feasibility analysis is carried out to ensure that the project is technically, operationally and economically feasible, and the MVC design pattern is adopted. This study aims to achieve effective separation of business logic, data representation, and user interface through the MVC (Model-View-Controller) design pattern, in order to build a clear, intuitive, and user-friendly Arabic learning platform. Through the development and implementation of the system, this study comprehensively analyzes the effectiveness of the platform in solving problems such as lack of Arabic learning resources, opaque materials, and errors in learning tools, aiming to provide a better learning experience and services for Arabic learners.

Keywords: Online Learning Platforms, Arabic Language Learning, New Media Web Technologies, Artificial Intelligence, Technology-assisted Learning.

1. Introduction

The development of current online learning platforms shows a booming trend. They not only provide a huge amount of learning resources, covering a wide range of fields from basic education to vocational training, but also introduce advanced technological means. With the increasing number of Arabic learners, numerous Arabic learning aids have emerged in the market, such as McAnee, Reverso and other online dictionaries. These tools utilize modern technological means, such as artificial intelligence, voice recognition, etc., to provide Arabic learners with a more convenient and efficient way of learning. Among the aids to Arabic learning, some tools have begun to utilize artificial intelligence technology to help learners better understand and master the Arabic language through techniques such as natural language processing.

In the existing research, current scholars have explored learning website design in depth from multiple perspectives. First, in terms of website structure design, researchers emphasize the importance of practice, believing that the application of theoretical knowledge and technical skills learned through the developed website platform can deepen the understanding and mastery of these knowledge and skills. For example, Xiao et al. developed an "edge-cloud" interactive computer vision innovation experimental platform based on the practical teaching needs of university courses in the context of intelligent manufacturing, which effectively enhanced students' innovative thinking and ability to solve complex engineering problems [1], while Chu et al. developed a graphical operation interface for students to use through the SLURM scheduling system and multi-framework and multi-dataset environment. develop a graphical operation interface to provide students with support for rapid introduction to AI practice [2], combining theory and practice; second, in terms of functional design, researchers have paid attention to the needs of new learning modes such as personalized learning and interactive learning, and Li et al. proposed that through the introduction of online commenting, online evaluation, online discussion forums and other functions, it can effectively solve the interaction and feedback between the learners and the lecturers real-time is insufficient, lack of long-term incentive mechanism and failure to establish a scientific evaluation system and other

common problems [3], while Cao et al. optimize the human-computer interaction design of the MOOC platform by increasing personalization and tailoring design, integrating multiple persuasion strategies, enhancing human-computer dialogue and other functions to improve the user's learning participation and effect [4]; In addition, user demand is also a non-negligible learning website design. For the learning and training of learners, Yan believes that a complete network training system should be established, including a scientific and advanced training platform, advanced design concepts, perfect course resource system and functional system, etc. This integrated development model is also in line with the trend of China's digital economy and the construction of a strong networked country [5].

At present, the discussion on language learning still maintains a vigorous development trend, showing a diversified trend, such as Song et al [6] use LDA topic model to extract implicit topics from Chinese-Vietnamese comparable news, with the help of rich Chinese annotated corpus, to solve the problem of insufficient resources of small languages, and to improve the effect of public opinion monitoring through the sharing of topic information between the bilinguals; Liu [7] et al, from the machine translation practitioner and researcher perspectives, introduced the work of cost-effective manual construction of parallel corpus for small languages, forming a summary of the construction methods of parallel corpus from small languages to Chinese. Some other researchers have also explored the aspect of language learning, such as Lu et al. who showed through experiments that virtual reality environments exemplified by VR technology can significantly enhance vocabulary learning, providing learners with contextualized and immersive learning experiences as well as real-time interaction and feedback [8]; Pan et al. who described the phonological features of Arabic as a rule from the perspective of linguistics, drew on traditional marking method and three-level analysis of the core of Arabic to summarize the rules of its formalization [9].

In order to improve the supporting tools for Arabic learning, it is necessary to further strengthen the technical research and development and innovation, and improve the quality and effect of the tools. Zhou et al. identified 11 evaluation indicators of online learning process through the mainstream indicator method and designed an evaluation model, which breaks the status quo of the evaluation of the "scores theory", and provides new ideas for personalized teaching and learning. New ideas for personalized teaching [10].

To summarize, among the existing research results, both the research on learning platforms and language learning itself are becoming more and more mature at the level of technology development. However, the current research on Arabic learning platforms is still in the preliminary stage, and the depth and breadth of the research are limited, far from meeting the urgent needs of the majority of learners. This study is dedicated to solving a series of problems in Arabic language learning, such as the lack of course resources, the lack of transparency of learning materials, the existence of grammatical errors in learning tools and inaccurate pronunciation, in order to provide a better learning experience and service for the majority of learners of the Arabic language.

2. System analysis

2.1. Functional Requirements Analysis

2.1.1. Overview of use cases

The use case diagram participant of this system has three identities, user, teacher and administrator, according to which different use cases can be operated. The high level use case diagram of the system is shown in Figure 1.

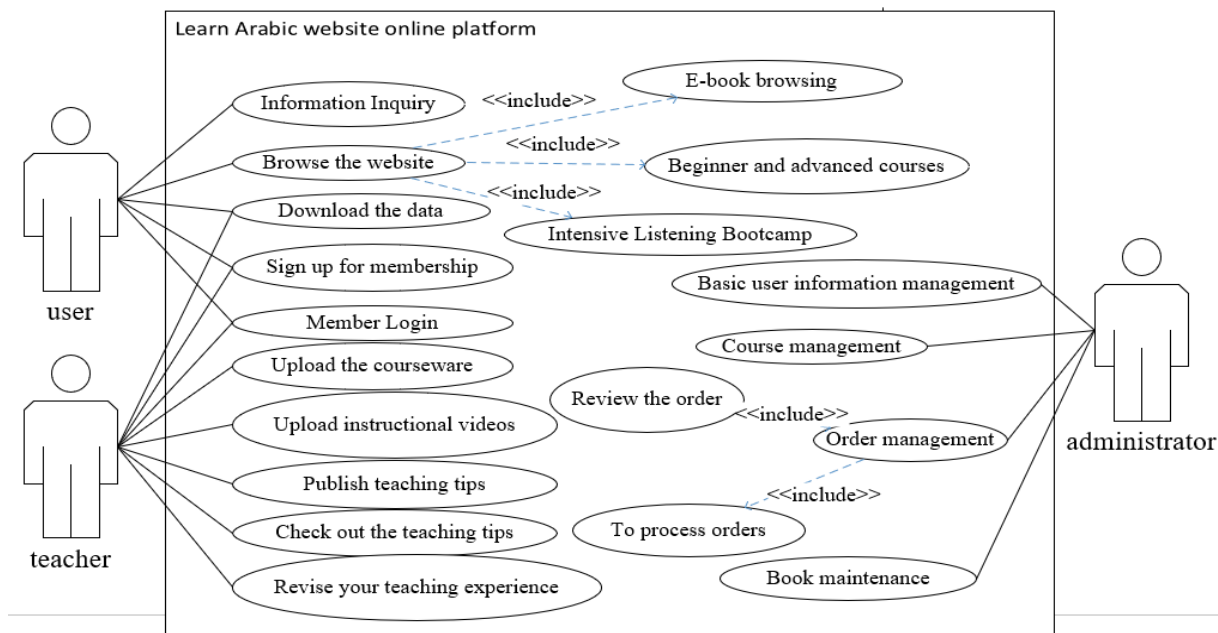


Figure 1. High-level use case diagram.

A summary description of the use cases for the high-level use case diagram is shown in Table. 1.

Table 1. Summary description of use cases.

	Use Case Name	Abstract Description
1	Information Enquiry	Users can view learning resources
2	Browse the website	Users browse the site for a diverse range of information content
3	Data Download	users and administrators can download the resources they need
4	Register Member	Users can register for membership and watch VIP classes
5	Member Login	Members log in to the site by entering the correct account number and password
6	Upload courseware	Teachers upload courseware files to the platform to share and store resources
7	Upload Instructional Videos	Teachers upload teaching videos to the platform for students to learn anytime, anywhere
8	Post Teaching Tips	Teachers or learners post their teaching experiences and insights on the platform
9	View Teaching Tips	Users can browse teaching tips on the platform to get other people's teaching experience and skills
10	Modify Teaching Tips	Users can modify the published teaching tips, update the content or correct errors to ensure the accuracy and timeliness of the information
11	Basic User Information Management	Administrators ensure that user information is accurate and permissions are properly assigned
12	Course Management	Administrators can judge, upload, download and categorize courses
13	Order Management	Administrators can complete order management operations
14	Book Maintenance	Administrators regularly update, organize and repair book information on the platform

2.1.2. Key Use Case Descriptions

The refinement of course management, the use case diagram is shown in Figure 2, contains use cases are download course materials, upload learning courses, audit learning courses, audit learning courses of the expansion of the use cases are: download learning courses, statistics learning courses, classification learning courses. In the course resource management module, administrators can perform different operations on course resources.

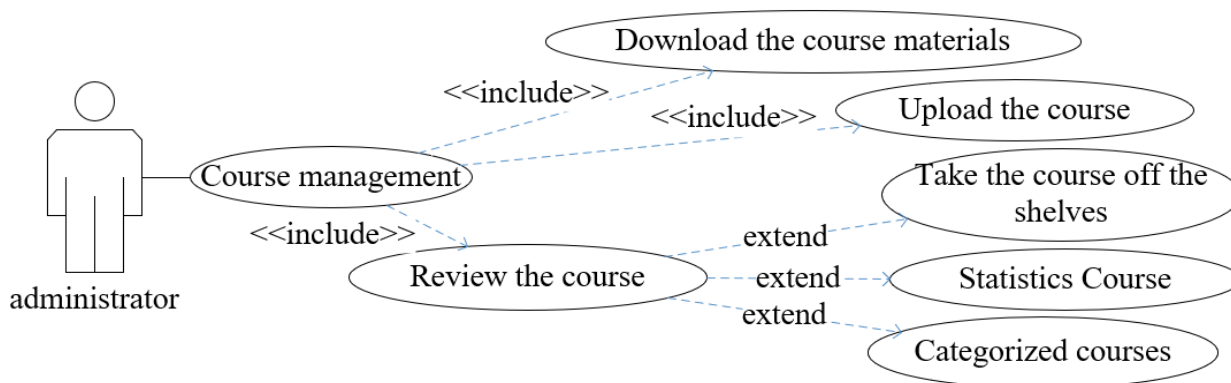


Figure 2. Course Management Refinement Use Case Diagram.

The learning resource use cases are described in Table. 2.

Table 2. Course Management Use Case Description Table.

Use Case Number	1
Use Case Name	Upload a course
Participant	Administrator
Pre-conditions	Already logged in as administrator
Postconditions	Add a course in the course management table
Use Case Overview	Administrators can add course resource information
Basic Event Flow	<ol style="list-style-type: none"> 1. The administrator selects the course learning information item in the main interface of managing learning resources 2. The system displays the course learning information interface 3. The administrator enters the basic information of the course learning resources and then submits the add request 4. The system completes the field verification to check the validity of the inputted course learning resources information 5. The system confirms that there is no duplicate learning resource record according to the main key of the course learning resource and records the entered learning resource information into the learning resource table 6. The system shows that the upload operation is successful

2.2. Feasibility analysis

2.2.1. Economic viability

After the system was launched, the Arabic learning platform not only provided users with rich learning resources, interactive, personalized and convenient learning methods, real-time feedback and community interaction, and other high-quality operating experiences to help users learn Arabic more efficiently and conveniently, but also brought considerable profit growth for merchants, and the platform could attract more learners, increase market share, and achieve profitability through precision marketing and advertising and promotion to realize profits. Although the initial development investment is necessary, considering that the system will be able to attract a large number of users and continue to provide high-quality services after it is launched, the economic benefits will far exceed the development costs. Therefore, in the long term, the database design of the Arabic learning platform is completely economically feasible, and its payback period can be realized in a short period of time, creating a win-win situation for both merchants and users.

2.2.2. Technical feasibility

The design of the Arabic learning platform takes the relational database model as the development model, and we adopt Eclipse as the development tool, MySQL as the database management system, Java as the programming language, SpringBoot as the key technology, and adopt the distributed and microservices architecture, as well as Vue as the front-end framework. Eclipse, as a mature JavaIDE, provides powerful code editing, debugging and project management functions, which can meet the

development needs of the Arabic learning platform; MySQL database is stable and efficient, and can support the storage of a large amount of user data and learning resources of the Arabic learning platform, and through reasonable database design and optimization, it can ensure the fast access and security of the data. Java has rich libraries and framework support, which can meet the processing requirements of complex business logic of the Arabic learning platform, the introduction of SpringBoot framework can further simplify the development process and improve the development efficiency, and the componentized development mode of Vue framework can improve the efficiency and maintainability of front-end development, and the Arabic learning platform can be richly realized through reasonable component design and data binding, Interactive user interface, Arabic learning platform can adopt distributed and microservice architecture to improve the scalability and maintainability of the system, by splitting different functional modules into independent microservices, it can realize independent deployment and upgrading of services, and improve the flexibility and stability of the system.

2.2.3. Operational feasibility

In terms of operation, for the Arabic language learning platform, this platform will design a clear, intuitive, and user-friendly interface to greatly improve the user experience. Through reasonable layout, concise and clear navigation, and consistent interaction methods, users can quickly find the required functions, reduce operating steps, and thus improve learning efficiency. For example, placing the most commonly used functions in a prominent position on the homepage, providing search functionality to help users quickly locate content, and using clear buttons and icons to guide user operations can all provide users with a convenient user experience.

In addition to basic interface design, the learning platform can also further enhance the user's learning experience by introducing some special features. These functions can include but are not limited to personalized learning recommendations, learning progress tracking, intelligent error books, community communication, etc. These features not only help users learn Arabic more efficiently, but also increase the fun and interactivity of learning.

For new users, we greatly reduce their learning costs, improve their satisfaction and loyalty by providing clear user guides, friendly error prompts, and concise and clear operating procedures. At the same time, by collecting user feedback and continuously optimizing platform functions, it can ensure that the platform always stays in sync with user needs, thereby providing users with a continuous and good learning experience.

In summary, the Arabic language learning platform has a high degree of feasibility in terms of operation, from interface design to the introduction of special functions, and then to the optimization of user learning speed. These measures can not only improve the user experience, but also increase user stickiness and satisfaction, laying a solid foundation for the long-term development of the platform.

2.3. Functional structure analysis

The Arabic online learning platform can be divided into resource information management, learning business management and basic user information management in terms of functional modules. According to the results of the demand research, this system mainly includes the following functional modules, and the functional structure diagram is shown in Figure 3.

The resource information management module is divided into six functional modules: data upload management, data download management, practice question bank design, simultaneous interpreting training camp development, foreign language book copyright management and learning course management. The learning business management module mainly includes the functions of material download restriction, membership management, order management and comment management. The basic user information management is mainly done by the administrator, which mainly includes the functions of personnel identity management, personal information maintenance, login management, and system privilege division.

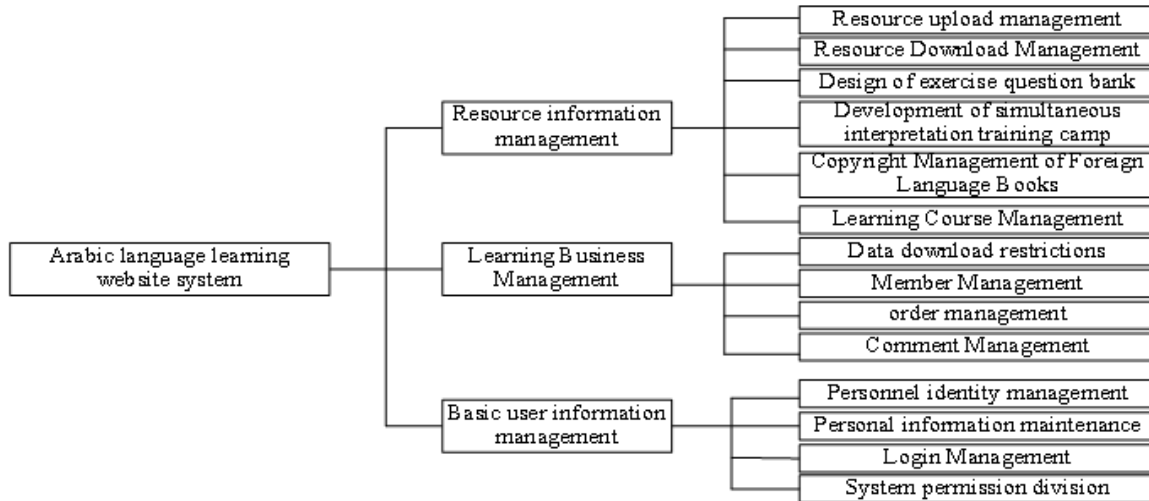


Figure 3. Functional structure diagram.

3. System design

3.1. System design principles

MVC (Model-View-Controller) design pattern is a widely used architectural pattern for software development that separates the business logic, data representation and user interface of an application. In the database design of the Arabic learning platform, we will use the MVC design pattern to separate the database model (Model) from the data access logic (Controller), in order to realize the decoupling of the business logic and the data representation, we use the jsp is mainly responsible for displaying the data to the user, that is, the view layer, in the Arabic learning platform, the jsp page is used to display the list of courses. On the Arabic learning platform, the jsp page is used to display the list of courses, user information, learning progress, etc.; the servlet is responsible for request forwarding, which is used to deal with the requests of user login, registration, course selection, etc. in this learning platform, and the javaBean encapsulates the lowest layer of system functions, which contains all kinds of business data models related to the Arabic learning, such as user information, course materials, learning progress, etc., and the operation logic of these data, such as data Javabean, as the data model layer, provides a unified data interface for the views and controllers in MVC, making the processing of data more modular and maintainable, and the basic schematic diagram of the MVC framework is shown in Figure 4.

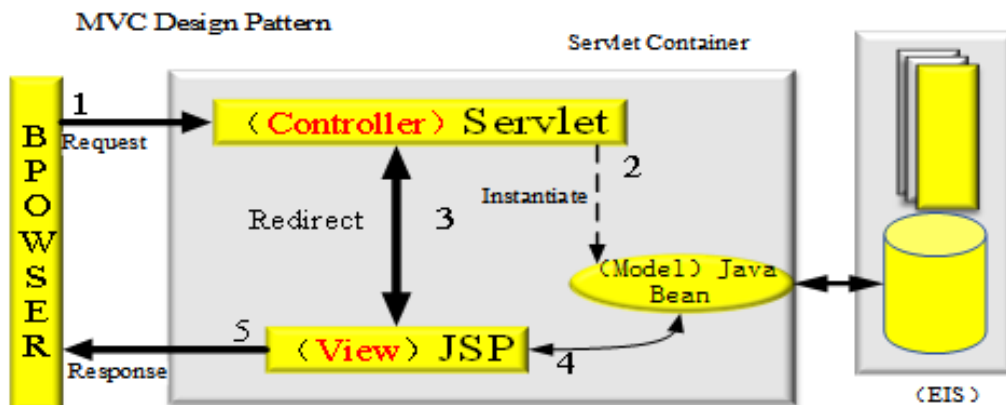


Figure 4. Basic principle diagram of MVC framework.

3.2. System framework architecture design

The server-side system architecture is shown in Figure 5.

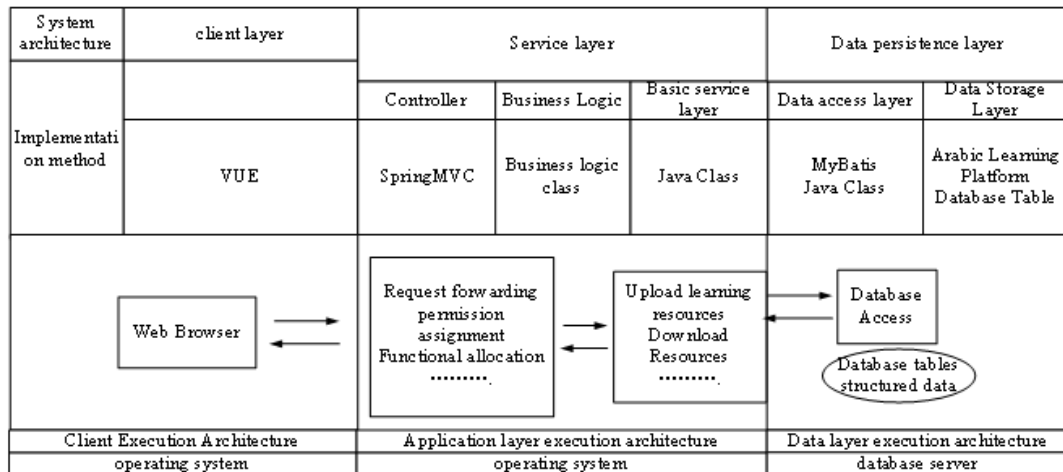


Figure 5. System Architecture Diagram.

The client layer provides an intuitive user interface by displaying the interface resources of the Arabic learning platform through an external browser. The service layer acts as an intermediate layer responsible for forwarding requests and encapsulating core functions such as user authentication, course management, learning progress tracking, etc. The data persistence layer interacts with the underlying database table structure to ensure secure storage and efficient access. The data persistence layer interacts with the underlying database table structure to ensure secure data storage and efficient access. The layers are closely connected and work together to provide users with a smooth and secure learning experience.

3.3. Database design

3.3.1. Conceptual structural design

The E-R diagram of the system is shown in Figure 6.

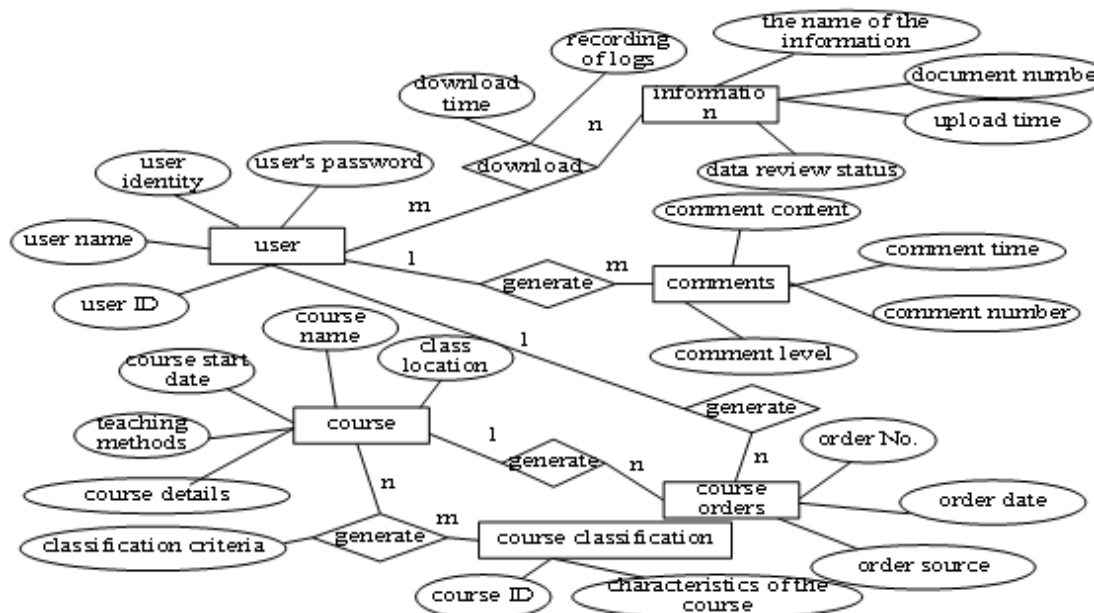


Figure 6. ER diagram.

This E-R diagram provides a detailed description of the data model implemented on the Arabic language learning platform, including the following core entities and their primary keys: entity A [user], with user ID as its primary key; Entity B [course], course details is its primary key, entity C [information], the name of the information is its primary key; Entity D [comments], with comment content as its primary key; Entity E [course orders], with order No. as its primary key; Entity F [course classification], with course ID as its primary key.

3.3.2. Physical design

The detailed design of the order form is shown in Table. 3; this table mainly explains the data types, whether they are empty and whether they are primary keys in the order table.

Table 3. Order form.

Column names	Clarification	Data type	Empty	Primary key
O_No.	Order Number	String	No	Yes
O_date	Order Date	Datetime	No	No
O_source	Order Source	Varchar	No	No

The detailed design of the course schedule is shown in Table.4; this table mainly explains the data types, whether they are empty and whether they are primary keys in the course schedule.

Table. 4. Curriculum.

Column names	Clarification	Data type	Empty	Primary key
C_id	Course name	Int	No	Yes
C_text	Course Details	Varchar	No	No
C_date	Course start date	Varchar	No	No
C_location	Venue of the class	Varchar	No	No
C_method	Mode of delivery	Varchar	No	No

4. System implementation

The system is mainly designed to meet the learning needs of Arabic learners and provide diverse learning resources and paths on this basis. The entire interface design is mainly concise and clear, with the top navigation bar containing the main functional categories of the website, such as "Excellent Courses", "Specialized Four Materials", "Film Appreciation", "Listening", "Practice", etc. These classifications allow users to quickly locate relevant content based on their learning needs. There are 8 commonly used shortcut entrances set up on the main interface, making it easy for learners to get started in the most prominent position. In the prominent position of the main interface, websites usually recommend some popular or characteristic Arabic courses. These courses may include introductory courses, advanced courses, specialized courses, etc., to meet the learning needs of different users. The exam preparation resource area is one of the most important parts on the main interface, which includes various Arabic learning resources, such as vocabulary, grammar rules, listening materials, reading materials, etc. These resources are usually displayed in the form of lists or icons, making it convenient for users to browse and select. The main interface of Xue'a Network is shown in Figure 7.

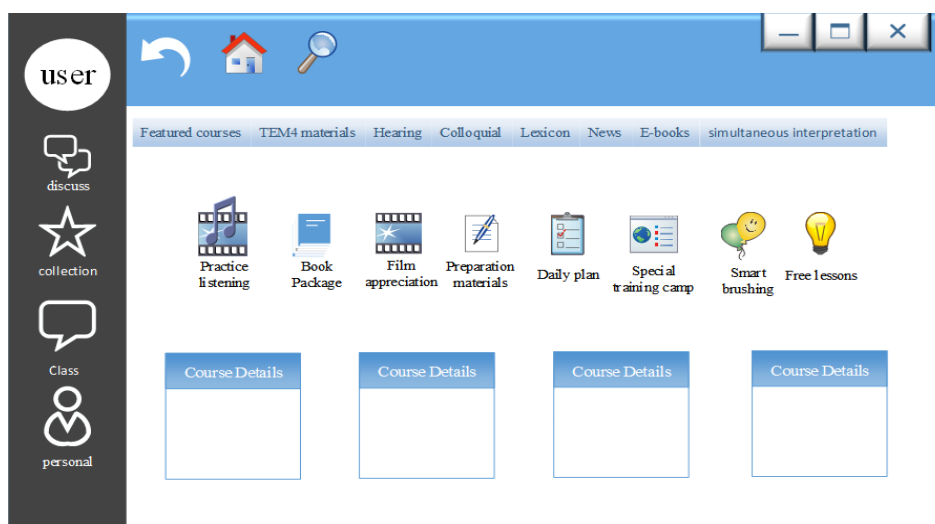


Figure 7. Arabic Learning Network Main Interface.

5. Conclusion

This study conducted a comprehensive analysis and optimization exploration of Arabic language learning websites, focusing on solving the problems of learning resource review and management, and proposing corresponding innovative solutions. The study focuses on the combination of theory and practice, and achieves a comprehensive upgrade of learning websites by optimizing human-computer interaction design and introducing online evaluation functions. At the same time, it also fully considers user needs. By constructing a complete online training system and introducing advanced design concepts, it meets the needs of learners for personalized and efficient learning.

By introducing advanced technological means and personalized learning concepts, this study has successfully improved the user experience and learning effectiveness of learning websites. Specifically, the study has solved key issues such as uneven resource quality and insufficient personalized learning paths, achieving effective management and efficient utilization of learning resources. This innovation not only provides a more convenient and efficient learning platform for Arabic learners, but also provides useful references for future learning website design.

In future research, system developers will continue to optimize Arabic language learning websites in terms of user experience, personalized learning paths, and diversified learning resources. Through in-depth exploration of user needs, the introduction of more advanced algorithms and models, as well as rich and diverse learning resources, the aim is to create a more comprehensive and intelligent Arabic language learning platform, meet the personalized needs of different learners, and promote the popularization and development of Arabic language learning.

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