Journal of Education and Educational Research
ISSN: 2957-9465 | Vol. 8, No. 3, 2024

Research on the Construction of Intelligent Library Micro-services System

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Abstract: With the advancement of the construction of smart libraries in China, grasping the new opportunities of scientific and technological revolution, providing micro-services based on their own resources to meet users' knowledge and information needs has become an important way for libraries to improve their own resource utilization, realize service upgrading and show their own value. Among many cutting-edge technologies, small programs based on micro-services have won the favor of the construction of smart library micro-services because of their characteristics of no download and instant search. However, at present, there are still many problems in smart library micro-services, such as lack of innovation in service content, single application of small program and lack of perfect service system. Therefore, it is necessary and urgent to deeply explore and study smart library micro-services.

Keywords: Smart Libraries; Micro-Services; The Improvement of System.

1. Background

With the popularization of 5G, mobile Internet, AI and other applications, the world is committed to building a digital nation. The Chinese government has put forward the strategic goal of "digital China" and "cultural power" construction, and has a clear strategic deployment of "recommending the common development and deep integration of online and offline public services, and actively developing online classrooms, Internet hospitals, smart libraries, etc." [1].To this end, public libraries across the country actively respond to the call to speed up the construction of recommended smart libraries, and provide readers with more intelligent and convenient services with the help of digital technology to meet the needs of the development of The Times.

At present, the construction of smart libraries in China is advancing steadily, and more and more libraries are developing in the direction of "smart", actively applying smart technology, planning smart Spaces, building smart venues, innovating smart services, and promoting smart management. At the same time, with the development of society, the proportion of people using desktop computers and laptops to surf the Internet is declining year by year, while the use of mobile users is gradually increasing. With the transition from PC Internet to mobile Internet, and the rapid development of user scale, mobile information services began to rise [2]. in this context, the smart library should seize this development opportunity, take advantage of the convenience and lightness of small programs, and develop and improve the smart library micro-services system on the premise of ensuring the provision of basic services for users, so as to improve reader satisfaction.

2. Significance

At present, the development and practice of smart library micro-services have attracted more and more attention from the public, among which, the construction of service system affects the development of smart library micro-services and even the development of smart libraries. This paper takes the construction of smart library as the research basis, puts forward development countermeasures from the aspects of promoting the construction of smart library micro-service system, and provides reference for the better construction of smart library and comprehensive deepening of micro-services in the future.

3. Research Status

3.1. Domestic Research Status

In 2011, the concept of "micro-services" was first proposed. At present, many domestic library and information scholars' research on smart library micro-services mainly focuses on the practical exploration of smart library micro-services, the research on the construction of smart library micro-services platform, the research on the development strategy of smart library micro-services, the research on the innovation of smart library service model and the research on the construction of smart library micro-services system. In terms of service practice exploration and research, Zhang Wei et al. (2022) developed the audio-visual resource knowledge service platform to meet the diversified audio-visual knowledge needs of users in the new era, providing users with "multi-form, knowledgeable and personalized" audio-visual micro-services to improve user experience and enhance service efficiency[3]. In terms of the research on service model innovation, Yi Gao (2021), guided by modern ecological theories, explores and analyzes the new smart library micro-service model featuring coordination and interaction between one and multiple subjects on the basis of sorting out and summarizing the characteristics, attributes and development models of library micro-service[4]s. In terms of research on the construction of micro-service system, Yang Qun et al. (2020) built a library intelligent micro-service function system from the perspective of block-chain development[5]. In order to promote the intelligent transformation and development of libraries, Li Xiaoming et al. (2022) built a library micro-services technology system by introducing a "cloud-native" architecture and building business centers and data centers[6]. There are a variety of existing service platforms, such as the scientific literature big data service platform built by Chang Zhijun[7], the new generation of

literature information resource guarantee platform built by Cheng Xiufeng[8], the long-term digital resource preservation system platform model proposed by Dong Xiaoli[9], and the smart data platform of DALIB, which provide references for the construction of a new generation of library service platform for smart libraries. Yu Hejian selected two of the most representative wisdom service platforms in the construction practice of domestic wisdom libraries, namely DALIB wisdom service platform and ultra-micro wisdom service platform, to compare and summarize their similarities and differences. In terms of micro-services development strategies, Huang Hongmei (2022) discussed the strategies for improving the subject analysis micro-service capabilities of university libraries through the causal analysis of the path for improving the subject analysis micro-services capabilities of university libraries [10].

3.2. Foreign Research Status

Wechat is the mainstream social platform used by netizens, but it is rarely used in foreign countries, so there is almost no research on library wechat mini programs. However, through literature reading, it is found that foreign libraries mainly use web2.0 technology to carry out mobile services, and the concept of web2.0 technology is the same as that of micro-services technology, which does not need to download, search and use. The research on web2.0 technology mainly focuses on the time exploration research and application status research of web2.0 technology in library.

To sum up, it can be found from the research results related to smart library micro-services that scholars pay more and more attention to the research of service platform, service model innovation, and application of new technologies, but lack systematic analysis of the construction of smart library service system, lack of in-depth theoretical research on library mini programs, and have not yet formed a systematic theoretical system of smart library micro-services.

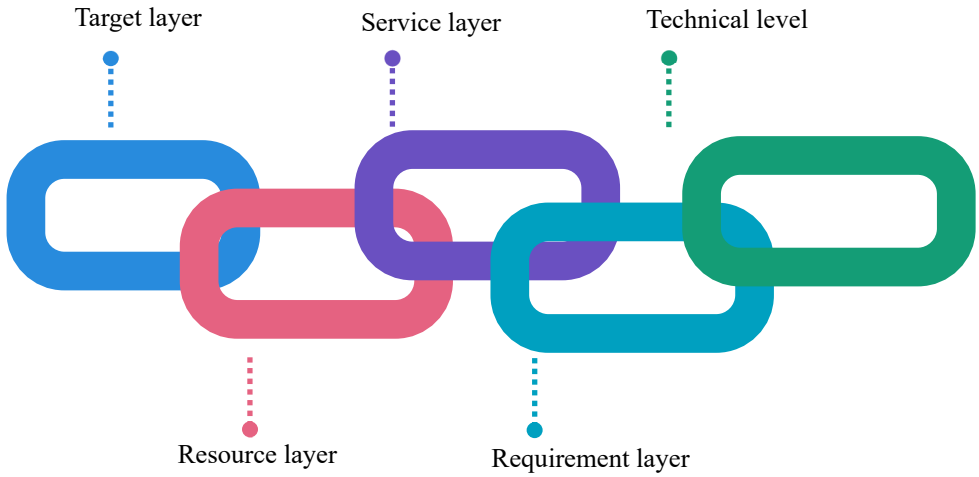
4. Smart Book Micro-service System Construction

In the context of the development of smart libraries, users' service needs tend to be more portable, convenient, personalized and other characteristics, and the emergence of wechat mini programs can well meet these service needs of users. To this end, the smart library can use wechat mini programs to carry out micro-services work. At present, many wisdom libraries in China have opened wechat mini program service platforms and provided a lot of micro-service content. However, there are still many development problems, such as insufficient attention to wechat mini programs in smart libraries and lack of innovation in micro-service content in some regions. In addition, when the smart library provides micro-service content to users through the wechat mini program service platform, it not only involves the development and maintenance of the wechat mini program service platform, but also involves the support and guarantee of human, material and financial resources. Therefore, in this context, it is necessary to build a sound smart library micro-service system, clarify the relationship between various elements and the operating mechanism of the system, and put forward feasible development strategies to provide reference for the development of smart library micro-services.

4.1. Smart Library Micro-Service Construction Ideas

The smart library micro-service system framework mainly includes five levels, namely, target layer, technology layer, service layer, resource layer and demand layer. In the service system framework, each level influences and interacts with each other to jointly promote the development of the smart library micro-service system. Among them, the target layer, as the top-level structure of the service system, contains the purpose of the construction of the smart library micro-service system, plays a leading role in the construction of the whole system, and promotes the improvement of the smart library micro-service ability. On the contrary, the improvement of the technology layer can better realize the purpose of the construction of the target layer micro-service system. For the technical layer, it is formed on the basis of the service layer, resource layer and demand layer, and the service layer, resource layer and demand layer are the basic elements of the smart library micro-service system, and play an indispensable role in the top-level construction of the entire service system. (Table 1)

Table 1. Framework of micro-services hierarchy elements in the context of smart library



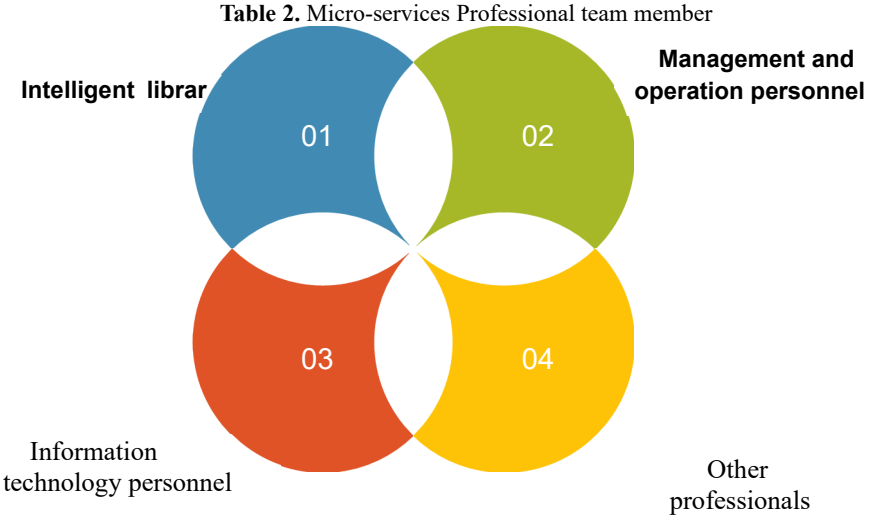
Through the establishment of the organizational structure of the smart Library micro-service center, professional micro-service teams with diversified professional backgrounds are established to play the main role of overall planning in micro-services; Through the integration and integration of material resources, the basic conditions for the processing, storage and

dissemination of micro-services are provided; Through mechanism improvement and technical support, it provides reliable guarantee for the processing, storage and dissemination of micro-services. In the service layer, through the construction of small program service platform, open up online and offline services, realize the precise push of micro-services, and finally build a smart library centered on user needs.

4.2. Organizational Structure of Smart Library Micro-Service Center

In the construction of the organizational structure of the smart Library micro-service center, the micro-service professional team, other staff and smart library users are mainly involved. This organizational structure is based on the establishment of a micro-service professional team. The team members are mainly composed of intelligent librarians, management and operation personnel, information technology personnel and other professionals (Table 2), who are responsible for all aspects of the work in the development of micro-services. In addition, the micro-services professional management staff can collaborate and mobilize with the staff of other departments of the Smart Library, and can also interact with users to obtain feedback information. Evaluate and constrain the work of micro-services professionals by establishing training systems, accountability systems, and incentives.

Table 2. Micro-services Professional team member



In terms of the establishment of micro-service professional teams, information technology talents are mainly responsible for the development and maintenance of the small program service platform, the maintenance of artificial intelligence equipment and infrastructure equipment, the support of network supervision technology, and the assistance of other librarians in the platform service work. The management and operation personnel are mainly responsible for the operation of the small program service platform, the organization and release of micro-service content, the management of big data, and the interaction with users. For smart librarians, they mainly undertake two aspects of work. First, undertake user-related service work, collect and analyze user information data and behavioral data, establish user information database, and assist management and operation personnel and information technology personnel to carry out various work. In terms of user management, smart librarians should analyze, plan service content and make service plans from the perspective of user group characteristics, and make certain adjustments according to user behavior data analysis. Second, it is responsible for the integration and optimal allocation of micro-service resources, which plays a crucial role in the content production process. Smart librarians should establish micro-service resource libraries including special databases, basic resource data and other resources, manage micro-service resources, and classify and summarize different types of micro-service content.

In terms of the management system of micro-service professional team, smart Library should adopt scientific and reasonable management methods for personnel management in combination with its own actual situation.

Finally, the micro-service professional manager should interact with users, communicate, cooperate and serve in a timely manner, and constantly adjust the mini program service platform and micro-service content according to user needs.

4.3. Smart Book Resource Integration and Mechanism Improvement

Resource integration and mechanism improvement are the foundation of smart library micro-service system construction. Among them, resource integration includes material resources and technology integration, and various technologies provide support for the equipment and database required for the development of smart library micro-services, ensure the effective operation of equipment and database, and support and guarantee the smooth development of smart library micro-services through continuous improvement of the system.

In resource integration, material resources mainly include data collection equipment, artificial intelligence equipment, infrastructure equipment, characteristic resource database and basic resource database, and various material resources play different roles in the construction of smart library micro-services. In the context of the development of smart libraries, the technologies used in the construction of micro-services mainly include 5G communication technology, multidimensional technology, data warehousing technology, big data analysis technology, and virtual simulation technology. Finally, the integration of various technologies and material resources jointly drives the construction of the micro-service platform and promotes the development of the

smart library micro-service development system.

In the improvement of the system, the government and the smart library should combine the development situation, timely update laws and policies, adjust and improve the relevant system. Through the analysis of system components at the practical level, the system construction of smart library micro-services mainly includes supervision system, management system, development planning, service standards and norms, and related policies. In terms of the work and development of librarians, the smart library should improve its management system and clarify the contents of the training system, responsibility system and incentive system. In order to ensure the sustainable development of the smart library micro-service system, the improvement of relevant mechanisms is indispensable.

To sum up, the integration and processing of various resources of the smart library helps to build an efficient micro-service platform, realize the full exploration and accurate disclosure of collection resources, provide users with high-quality collection resources and efficient and convenient micro-services, promote the value-added of library resources, and better meet the needs of diversified users.

5. Conclusion

With the elderly and young people of Yinfa having access to the Internet one after another, smart library, as the main body of public cultural services, should continuously strengthen the construction of smart mobile information services, provide users with more convenient, intelligent and personalized mobile information service content, and meet users' needs for information resources, space and environment, service efficiency and scientific literacy. In order to further promote the construction and development of smart library micro-services system, this study analyzed the concept and characteristics of micro-services, characteristics of smart library micro-services and service system on the basis of combing relevant research results at home and abroad, and then proposed construction and development strategies on the construction of micro-services system, in order to improve the micro-services capability of smart library. High quality and high level of service to the majority of users.

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