Research on Library functional layout based on Intelligent occupying system

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Abstract. At present, university libraries are using the intelligent management system of library public seats introduced by our library, that is, the reservation system of public space seats. With the increase of the enrolment rate of higher education in our country, the demand for intelligent management in university libraries will become more and more important, but based on the nature of each university and the demand for public resources. Therefore, I hope that through this paper to introduce some experience of the intelligent seat management system of University libraries, to find a more suitable operating scheme for the actual situation of the library, and as a breakthrough to achieve library functional zoning and planning.

1. Introduction
According to the statistics of the Ministry of Education, the main goals of the Twelfth Five-Year Plan for the development of education show that the gross enrolment rate of higher education will reach 40% in 2015 and 50% in the 13th Five-Year Plan for the development of education and human resources. These data also indicate that the number of students in our school will continue to increase in the next few years, and the library as the second classroom, students’ demand for the library will become more urgent, and how the limited public resources of the library can be more reasonable use to meet different needs of readers, is becoming more and more important. Because the self-study atmosphere and environment of the library are superior to other self-study places, the phenomenon of "shortage" of Library seats has been caused, and these phenomena have caused a series of contradictions between readers, affecting the atmosphere of the library and waste of resources. Taking Jianghan University as an example, the survey shows that there are about 17 294 registered students in the library. The number of students in each grade is distributed (Fig. 1). The Library of Jianghan University provides 2456 self-study places for readers, including 1062 reading room seats, 98 leisure seats and 129 study hall seats included in the management system (Fig. 2).Because the building structure of the museum is semi-closed, each reading room is open to each other for a limited time, and sometimes to undertake small group activities of readers, so reading room seats should not be included in the system management.

2. Analysis and generalization of library seat status
The readers of this school library study by themselves for the purpose of textual research, examination grade, examination and so on. Generally speaking, they do not choose reading room seats or leisure seats, and they choose the seats in the study hall for study. Therefore, serious occupancy and rush for
seats often occur to stimulate contradictions. In order to solve the confusion in the self-study hall and let the readers study civilly, it is an inevitable trend to introduce the intelligent management system of public seats in libraries.

![Figure 1](image1.png) **Figure. 1** The number of library enrolment.  

![Figure 2](image2.png) **Figure. 2** Proportion of seat types in libraries.

In terms of readers, the library faces a wide audience of readers, and the quality of the readers is uneven. Many readers are self-centered, over-emphasizing personal interests, ignoring library rules and regulations, lacking social morality, ignoring the interests of other readers, and failing to fundamentally realize the mistakes of occupying seats. Despising the existence of the intelligent management system of public seats has a very bad impact on the readers who use the system. If not intervened in time, the system will only lead to the virtual.

From the system aspect, when the reader registration system, only the We-Chat phone number information is available, there is no real name, grade, college and other information; There will be a phenomenon that readers swipe cards instead of others, but also lead to the background cannot do scientific classification of information, comparison, analysis and other large data formation, is not conducive to future system adjustment work. Readers forget to withdraw from their seats when they leave the building, the system cannot timely identify whether the reader is studying in the library, only rely on the supervision of other readers or after the system automatically released, easily lead to waste of resources. The system seating rate does not reach 30% can not be used to supervise the occupancy of seats, but the actual situation is that the use of seats is higher, fewer people through the system to select seats.

From the aspect of functional resources distribution, university library is an important part of school teaching and scientific research work. It should cooperate with school teaching and scientific research work, provide the readers with literature and information, so that readers can get knowledge to be educated. At present, readers regard libraries as better places for self-study. They think that libraries should only provide services for these self-study readers, more study seats, more lockers and even fixed seats should be provided for them. Once their interests are touched, all the rules and regulations go unheeded. The function of the library is not only to meet the needs of self-study readers, how to plan and manage library resources is imminent.

3. Application and popularization of library intelligent seat selection system

3.1 Intelligent occupying system usage settings.

As First, registration. Readers need to pay attention to the public number of "to select" through WeChat APP, select "Jianghan University" to enter the mobile phone number binding (see Figure 3), can directly enter the interface, check the use of seats on the various floors of the library, make reservations, check-in, suspend, leave the library and other operations. Second, pick your seat and sign in. After the reader enters the public number interface, the system shows the proportion of seats on each floor to the reader. In the interface, the red seat is in use, the yellow seat is reserved, the blue seat is temporary, and the white seat is optional (see Figure 4). The background will send a real-time two-dimensional code to the reader, Scan the code and check in at any verification equipment after you
arrive at the library. Third, Readers should verification at any verification equipment before leaving the library, release the seats for other readers to use.

3.2. Personalized function and supervisory feedback system.
Temporary departure: Temporary need to leave, in three cases: temporary departure (20 minutes) can be used three times a day, lunch (60 minutes), dinner (60 minutes), meal status can only be selected in a specific period of time (11:00-13:00, 17:00-18:30). Blacklist: Readers who violate the rules 3 times within 7 days will be blacklisted and will not be allowed to use the system 3 days after the blacklist is completed; the system will automatically release the list and can continue to use it. Collection: Readers can collect 2 like seats; open the system can be a key reservation, efficient and timely booking to the like of the seat. Supervised Seat Occupancy: If the reader discovers the behaviour of occupying seats, the venue and the seats are marked unmanned, and after successful uploading of the live photos containing the empty seats and seating numbers, the supervised will receive information, and the seats will be released if they are not returned within 8 minutes; the supervisor can only mark one person at a time, and the malicious marks will be blacklisted. Points conversion props: check-in, successfully retained once, successfully supervised once, the length of study can be obtained corresponding points, up to 40 points a day; 15 points are deducted once for violations; the reader's points can be converted into corresponding points within the system props, such as prolonged verification time, erasing violation records, blacklist clearance, etc.

3.3. Better popularize the intelligent seat selection system.
Intelligent management system of public seats in libraries is integrated into freshmen's admission education. Through systematic study in the classroom, students can understand and master the use and rules of the system; through the entrance examination for new students, they can better understand the use of the system, from small cultivate good habits of selecting seats to improve the utilization rate, and have the awareness of maintaining a good learning environment. Social readers need to know the rules of the library and the rules of the use of the system when they receive the reader's card, and distribute brochures on library rules and regulations and the introduction of the intelligent management system of library public seats for their study.

The library will increase the seats in the study hall, extend the opening time of the reading room, and allow readers to bring learning materials into the reading room for long-term study and reading. We should change the reading room into an open one and add a "small speaker" service station to broadcast important notices in time so as to enhance publicity and influence. Official micro-blogs, official micro-letters, QQ group of seat-selecting assistants and micro-letters group of seat-selecting
assistants have been opened in the library. By using the new media commonly used by readers, information and notices have been issued, so that readers can grasp the library’s dynamics and reader interaction in the first time. Binding with the reader's lending card, importing the real information of readers, and better supporting the backstage big data. The positioning system in the library can monitor the reader's trajectory in real time. The system can release the seats at the first moment before leaving the library. It can also be bound with the entrance guard system in the library. Under the condition of mature technology, the face recognition system is introduced to optimize the system structure.

4. Intelligent management and functional zoning of Library seats
At present, the system has been put into use for one month, readers are familiar with the use of our library system, the daily use of a lower number of people, mainly concerned about the use of the crowd is postgraduate entrance examination readers, from the figure 5 can be seen that the fourth and fifth floor postgraduate entrance examination area on the use of the system is the highest, one person occupies more, the phenomenon of occupying seats with goods has greatly improved. Readers are developing the habit of booking seats and moving people away every day.

Before putting the system into use, the technical staff of the library cooperated with the development team to draw the plan of the study hall on each floor and numbered each seat. Readers can intuitively see the layout of the seats in the library, the number of the seats, the punch-in place, the safety exit and so on through the system. Seat selection is as clear as the APP voting film ticket, greatly saving the time for readers to find seats in the library.

Before the implementation of intelligent management of public seats, the contradiction between the limited resources of the library and the reader's demand becomes more and more prominent in the face of the peak of self-study such as final exam, qualification certificate exam, CET-4, CET-6 and postgraduate entrance exam. Readers who come to the library every morning when it have not opened have already queued up, crowded into the library to snatch seats, that's unsafety. Through intelligent management of public seats, readers can enter the system half an hour before the opening of the library, and reserve their favorite seats in the dormitory or dining hall, which solves the problem of crowded readers queuing and effectively solves the uncivilized occupancy of seats.

5. Conclusion
The intelligent management system of public seats in university libraries is simple and easy to learn by means of the public number of We-Chat. Readers are still familiar with the use of the system, but with the in-depth publicity, system optimization, will better serve more readers, more readers will use the system to safeguard their rights and interests, civilized use of public resources, cultivate good civilized habits. In the future, university libraries are bound to use more new intelligent management system technology, improve the overall service and management ability, create a new spatial planning and layout experience, improve the level of Intelligent Library services, more should be the direction of this subject to continue to study.
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