

# *Research on Library Collection Optimization Based on Collection Structure and Literature Utilization Ratio—A Case Study of Nanhu Branch Library of Central China Normal University*

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**Abstract:** In this paper, descriptive statistics method is adopted to make a statistical analysis of the collection data of Nanhu Branch Library of Central China Normal University from 2021 to 2022. According to faculties in Nanhu Campus, the demands of readers, as well as the utilization rate of library literatures in Nanhu Branch Library, this paper intends to put forward some suggestions on library collection optimization to maximize the utilization rate of library literatures.

## 1. Introduction

With the progress and development of modern science and technology, a large plenty of libraries are actively exploring and innovating to build a new library with standard and high quality literatures [1]. Nanhu Branch Library of Central China Normal University is a brand new digital library that integrates lending, new technology experience and humanistic training. In order to adapt the changes in reading demands of teachers and students, Nanhu Branch Library establishes the digital library with the purpose that takes readers' demands as the core part, focus on the new technology experience and information sharing. In order to realize the goal, Nanhu Branch Library intends to provide first-class hardware equipment and establish the most appropriate literature collection structure so as to create a good environment of diversified reading scenes for teachers and students.

Nanhu Branch Library of Central China Normal University has a relatively short opening time. It officially opened in September 2020, and the permission for borrowing books was granted in April 2021. Since then, the majority of teachers and students actively borrow books which reflect the extensive needs of readers for book reading. At the same time, due to the lack of statistical analysis research on Nanhu Branch Library literature borrowing condition in the early stage, there are some errors between library collections procurement and allocation and the actual demands of the faculties in Nanhu Campus. In this paper, the collection and borrowing data of Nanhu Branch Library from 2021-2022 will be selected for statistical analysis, and the most suitable literature will

be selected for procurement and allocation to meet the actual needs of teachers and students of the faculties, so as to maximize the matching degree between the collection of the Nanhu Branch Library and the needs of teachers and students of Nanhu Campus.

The data studied by the author are all derived from Libsys5.6, the Huiwen Literature Information Service System used by the library of Central China Normal University, and the statistical data are the structure of new books in the collection from 2021 to 2022, and the circulation data generated from January 1, 2022 to December 31, 2022, and the analysis indicators include: classification structure, literature utilization rate, and classification lending statistics.

## 2. Analysis of Collection Structure of Nanhu Branch Library

The construction of collection resources is the foundation of university libraries to serve teachers and students, paper books as the core part of the library, which plays an irreplaceable role in the literature resource guarantee system [2]. Regular investigation, statistics, quantification, analysis and evaluation of collection literature is an important task of collection management, is the fundamental place to improve the quality of library services [3]. In addition, the collection structure is also one of the criteria for measuring whether the hard conditions of a library are compatible with the university level [4]. University libraries should adjust their collections according to their school-running characteristics and faculties structure, and establish a reasonable collection structure, which should not only highlight the characteristics of school-running, but also take into account the reading needs of teachers and students [5]. The classification and statistical analysis of library books is the most direct evaluation method to test whether the collection structure is reasonable, systematic and scientific, and can also provide scientific guidance for the next year's procurement based on this structure [6].

Huazhong Normal University (HNU) is a multi-disciplinary university with education and literature as its main focus and multi-disciplinary cross-penetration and coordinated development, covering 10 disciplines such as philosophy, economics, law, education, literature, history, science, engineering, management and art. Nanhu Campus has eight schools: School of Computer Science, School of Artificial Intelligence Education, School of Psychology, School of Psychology, School of Social Science, School of Social Science, School of Social Science, School of Social Science, School of Social science. Wollongong has joint research Institute, School of Physical Education, School of Public Administration, School of Economics and Business Administration, School of Information Management and so on. According to the collection statistics table for 2021-2022, books of various disciplines in the Nanhu Branch Library have been collected, achieving 100% coverage of the collection of Nanhu disciplines.

As of December 31, 2022, the Nanhu Branch Library has a total of 84,504 kinds of literature and 88,603 volumes, with a total price of 4,887,249.32 yuan. In the space of a year, the branch library's collection has grown significantly. In terms of the number of documents in the collection, it increased by 12.48% compared with 75,121 in 2021. In terms of the number of collections of literature, it increased by 11.99% compared with 79,084 volumes in 2021. It reflects that the branch library actively purchased and collected library collections during the year, the growth rate of collection resources was relatively fast, providing more adequate resource support for readers, and also reflected the library's efforts and improvements in procurement and management.

From the perspective of the proportion of literatures in the collection (Figure 1), the category with the largest collection is I (Literature), with a collection of 16486 volumes, accounting for 18.61% of the total collection of Nanhu Branch Library; followed by G (Culture, Science, Education and Sports), with a collection of 14,823 volumes, accounting for 16.73% of the total collection of Nanhu Branch Library; D (Political and Law) ranks third in terms of collection, with 12,941

volumes, accounting for 14.61% of Nanhu's total collection.

B (Philosophy), C (General Theory of Social Sciences), F (Economics) and K (History and Geography) have large collections, all of which exceed 5,000 volumes, accounting for 7.52%, 6.14%, 10.63% and 13.81% of the total collection of Nanhu Branch Library respectively.

The smaller categories are N (General Introduction of Natural Sciences), P (Astronomy and Earth Sciences), Q (Biological Sciences), S (Agricultural Sciences), U (Transportation), V (Aerospace), X (Environmental Sciences and Safety Sciences), and all have less than 50 volumes.

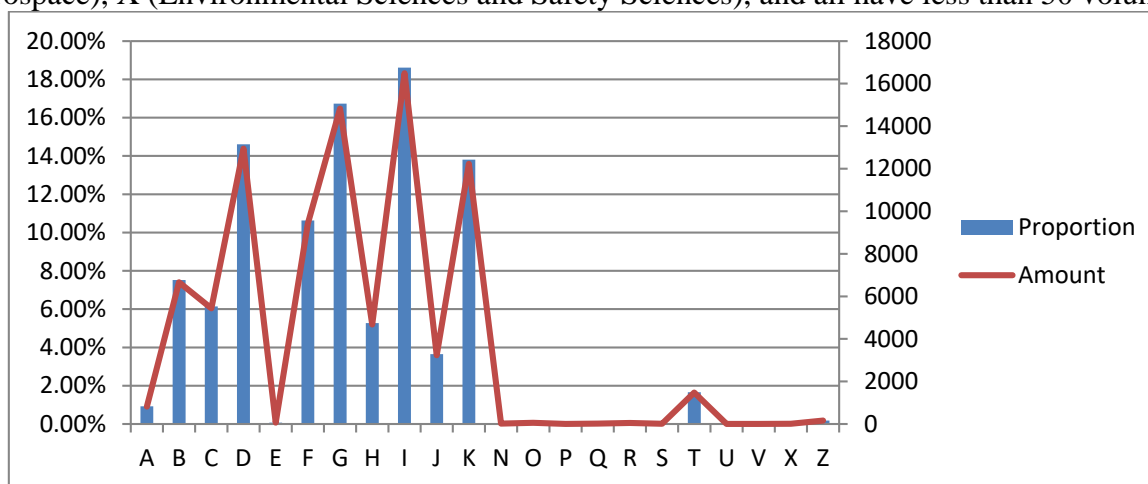


Figure 1: Classified Proportion and Amount of Literature of Nanhu Branch Library in 2022

### 3. Analysis of Literature Utilization of Nanhu Branch Library

Literature utilization ratio is a new term proposed by Library Information and Philology in 2019, which refers to the ratio of the number of borrowed books of a certain type of literature to the total number of books available for borrowing in a certain period of time [7], that is, the number of utilized books in the collection accounts for the percentage of all available collections. The literature utilization ratio can reflect whether the collection resources meet the needs of readers, which is an important criterion to measure the effect of library work [8], from which we can see the quality of service and the quality of library collections.

According to the literature utilization ratio (Figure 2), it can be seen that the collection utilization rate of different types of books in the Nanhu Branch Library varies greatly. T (Industrial and Technology) and R (Medicine and health) have the highest literature utilization rate, 39.46% and 42.31%, respectively, followed by B (Philosophy) and C (General Theory of Social Sciences) also have higher literature utilization rate, 11.38% and 10.48%, respectively. Nanhu Branch Library has some categories with larger collections, but lower utilization rate, such as D (Political and Law), J (Art), their literature utilization rates are less than 5%. And there are some categories with small collections, but relatively high literature utilization, such as O (Mathematical Sciences and Chemistry), R (Medicine and health), all with utilization rates of more than 25%.

This data reflects some problems in the selection of books in the Nanhu Branch Library. Some disciplines have a large collection volume, but the utilization rate of literature is low. Firstly, these collections are not accurate and outdated, and secondly, the relevant faculties are not located in the Nanhu Campus and the teaching and research enthusiasm of the disciplines is low, resulting in little demand for these collections by readers, so it is necessary to consider the problem of book allocation with the main library. On the contrary, some disciplines have smaller collections, but the utilization rate of literature is higher, which may be because the teaching and research enthusiasm of these disciplines is high, but the collection of Nanhu Branch Library cannot meet the needs of

readers.

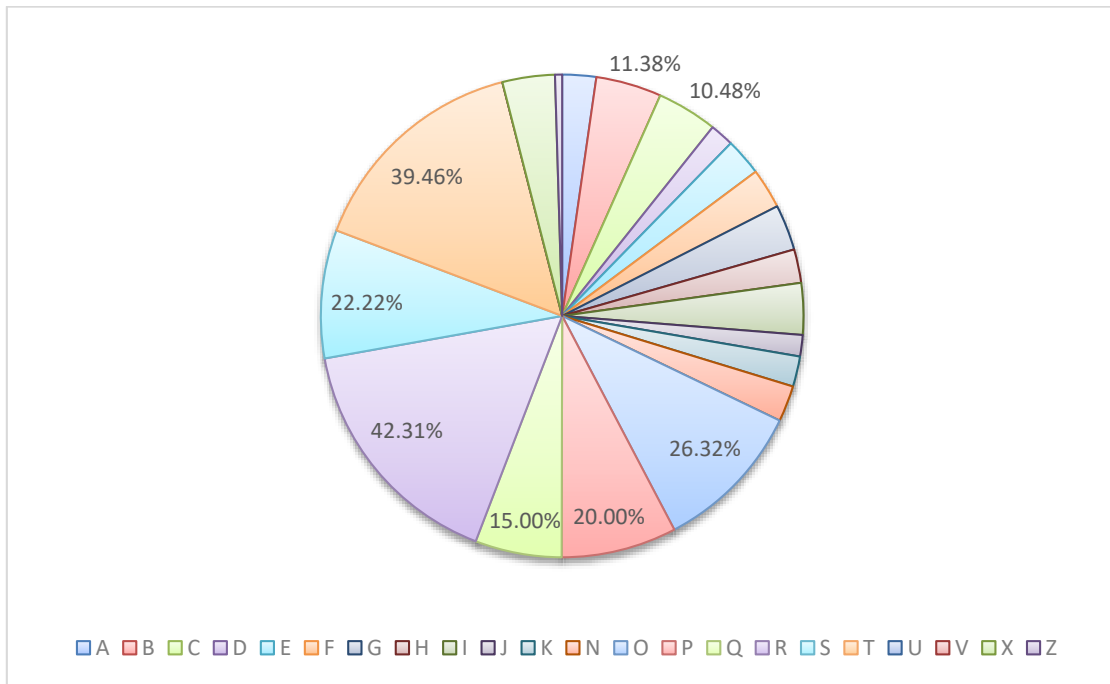


Figure 2: Classified Literature Utilization Rate of Nanhu Branch Library in 2022

Therefore, when introducing the collection, Nanhu Branch Library needs to select books more accurately according to the teaching and research enthusiasm of the discipline, so as to improve the utilization rate of literature and meet the needs of readers. At the same time, the Nanhu Branch Library should also pay attention to the problem of low utilization rate of literature in some disciplines, clean up and update outdated collections in a timely manner, and allocate books with the main library to improve the efficiency and service quality of the library. In addition, for books with small collections and high utilization rates, they can also be purchased according to the trend and popularity of the discipline to meet the needs of teachers and students.

#### 4. Analysis of Classification Lending Statistics of Nanhu Branch Library

Classified lending statistics refer to the borrowing of a certain type of literature by readers in a certain period of time, which is an important method to understand the circulation of literature and the changes in readers' needs [9]. Through daily borrowing analysis, understand the reading tendency of readers and grasp the characteristics of readers' demand for literature [10].

In terms of the number of borrowed books (Figure 3), the annual number of borrowers in the Nanhu Branch Library reached 2,334, and the number of borrowed books reached 8,816. Among them, I (Literature) and G (Culture, Science, Education and Sports) are the two categories with the largest number of loans, they were borrowed 1985 and 1400 books, accounting for 22.51% and 15.88% respectively, followed by B (Philosophy) and T (Industrial and Technology), which were borrowed 965 and 960 books, accounting for 10.94% and 10.89% respectively. The remaining categories had a low borrowing volume, with a borrowing ratio of less than 10 per cent. Among them, the number of annual borrowed books in categories N (General Introduction of Natural Sciences), P (Astronomy and Earth Sciences), Q (Biological Sciences), S (Agricultural Sciences), U (Transportation), V (Aerospace), X (Environmental Sciences and Safety Sciences) and Z (Comprehensive Book) is less than 5 books. There is a big difference in the number of books borrowed for different types of books in the entire Nanhu Branch Library. This may be because

these categories of books have a small audience, or because these books are more specialized and only a subset of readers will be interested.

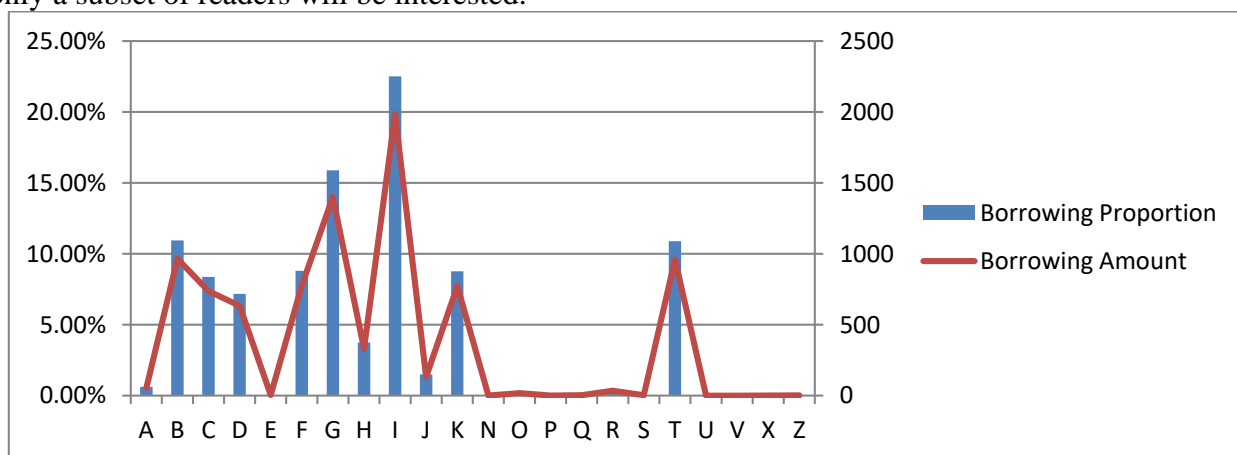


Figure 3: Classified Borrowing Proportion and Amount of Nanhu Branch Library in 2022

## 5. Summary

The goal of modern library collection management is to maximize the matching of library resources with the needs of readers [11]. The above statistics and analysis show that while maintaining the collection, the library timely adjusts the procurement strategy, optimizes the collection, makes the resource construction develop in a more scientific and standardized direction, and allows limited funds to play a greater role [12].

Through the analysis, it can be seen that the distribution of faculties in Nanhu Campus roughly matches the books in the collection of Nanhu Branch Library. At the same time, however, some of the faculty's corresponding book categories, such as computer science and sports, have a low level of related collections, which may lead to the school's teaching and research needs not being met. Therefore, the Nanhu Branch Library should pay more attention to the needs of these faculties in the future collection and editing work, and increase the collection and editing efforts in this field. According to the 2022 collection volume and literature utilization rate of various disciplines, in order to save procurement costs, improve the utilization rate of literature, and meet the needs of readers in a more targeted manner, the following measures are proposed, and the detailed strategies are shown in Table 1.

Table 1: Collection Optimization Strategies

Statistical Results	Subject Category	Optimize Strategy
Large Collection and High Borrowing rate	B,C,F,G,I	Maintain the current volume and increase the collection appropriately
Large Collection and Low Borrowing rate	A,D,H,J,K	Control current volumes, reduce purchases, and eliminate useless collections
Small Collection and High Borrowing rate	T,O,R	Expand the amount of storage and increase the variety
Small Collection and Low Borrowing rate	E,N,P,Q,S,U,V,X,Z	Strengthen the matching of disciplines and increase the collection by a small amount

According to Table 1, Nanhu Branch Library should realize the dynamic structure adjustment of

the collection within the scope of limited funds according to the needs of readers. Due to the rapid growth of information, coupled with limited funds and space, no library can collect all the information [13]. Understanding the needs of readers, meeting the needs of readers, and enhancing the matching degree of subject literature and readers is what every library is trying its best to do [14], so it is imperative to conduct statistics and analysis of the collection of documents every year, and through analysis can timely supplement some important literatures at the forefront of disciplines, eliminate some old literatures, is an important measure for collection optimization [15]. Literature with a large collection and a high borrowing rate indicates that readers have a large demand for such literature, so it is possible to increase the selection of more diversified literature subcategories while maintaining the current number of literature to meet the needs of readers in various aspects. For literatures with a large collection and low borrowing rate, the procurement of such literatures should be reduced, and old books should be eliminated to improve the pertinence of literature. For literatures with small collection and high borrowing rate, such as T (Industrial and Technology), O, and R, it is necessary to analyze specifically. The 8 schools of Central China Normal University in Nanhu Campus cover the School of Computer Science and the Department of Artificial Intelligence Education, and the collection of T category is only 1475 books, which is far from meeting the borrowing needs of readers, so it is necessary to strengthen interviews and increase the procurement of such literature. For O (Mathematical Sciences and Chemistry) and R (Medicine and health) literature, Nanhu Campus does not cover such majors, but from the data, readers' demand for such books is high, and the utilization rate of R (Medicine and health) is even as high as 42.31%. Therefore, the procurement of such books can be appropriately increased, and attention should be paid to keeping pace with the times, grasping the latest subject information, and focusing on the diversified development needs of readers. For literatures with a small collection and a low borrowing rate, it is possible to increase the collection by a small amount while maintaining the current volume. The purchase of such collections can strengthen the connection with the existing disciplines of Nanhu Campus and realize the linkage of disciplines to achieve the purpose of improving the utilization rate of literature.

In addition, the Nanhu Branch Library plans to strengthen the sorting of book classification and reading statistics. The Categorical Reading Statistics Table can be used to record statistical data on the reader's reading and research use of various literature resources in the library. These data can provide information on the use of various categories of books and the needs of readers in the reading room, which is conducive to the resource allocation and service improvement of the library. At the same time, the categorical reading statistics table is also a means of monitoring the efficiency and service quality of library operations, which can help libraries evaluate their service quality and provide data support for service improvement.

Finally, in order to improve the utilization rate of literature in the Nanhu Branch Library, the Nanhu Branch Library can carry out reading promotion and strengthen the connection with the faculties. Strengthening reading promotion can improve readers' interest and reading level. The Nanhu Branch Library can attract more readers to participate in reading by holding reading activities, recommending books, and holding lectures. At the same time, the Nanhu Branch Library should also pay attention to reading guidance and cultivate readers' reading habits, and encourage readers to think independently and explore knowledge. Strengthening departmental links can also promote better use of library resources. Libraries can establish close links with faculties, understand their teaching and research needs, and provide them with relevant resources and services. In addition, the library can also enrich collection resources, increase new book recommendations, and improve service quality and efficiency through cooperation with various departments.

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