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## Postprint: Characteristics of Master's Students' Academic Literature and Information Resource Usage Behavior Based on Thesis Citations

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### Abstract

[Purpose/Significance] Understanding the behavioral characteristics of academic literature information resource usage holds significant importance for improving master's students' ability to utilize academic literature information resources, the quality of their thesis writing, and the development level of library literature information resources. [Method/Process] By constructing an analytical framework for academic literature information resource usage behavior, this study quantitatively compares the usage behaviors of library science master's students from three perspectives—individual, temporal, and institutional—and analyzes their underlying causes. [Results/Conclusion] The study finds that master's students from different universities and time periods exhibit distinct characteristics in their use of academic literature information resources. For instance, journal articles and Chinese-language literature are used most frequently, while the usage of online information resources, dissertations, and English-language literature shows an upward trend, with significant differences existing among universities. Master's students' educational background, information literacy, foreign language proficiency, and research topics, as well as the quantity, type, availability, and service quality of literature information resources, all influence their usage behavior.

### Full Text

#### A Study on the Characteristics of Master's Students' Usage Behaviors of Academic Literature Information Resources from the Perspective of Dissertation Citations

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**Abstract:**

[Purpose/Significance] Understanding the characteristics of academic literature information resource usage behaviors is crucial for improving master's students' ability to utilize academic literature resources, enhancing dissertation writing quality, and advancing library literature information resource construction. [Method/Process] By constructing an analytical system for academic literature information resource usage behaviors, this study quantitatively compares the usage behaviors of library science master's students from individual, temporal, and institutional perspectives, and analyzes the underlying reasons. [Result/Conclusion] The study reveals that master's students from different universities and time periods exhibit distinct characteristics in their use of academic literature information resources. For instance, journal articles and Chinese-language literature are most frequently used, while the usage of network information resources, dissertations, and English-language literature shows an upward trend, with significant differences observed across universities. Master's students' usage behaviors are influenced by their educational background, information literacy, foreign language proficiency, and research topics, as well as by the quantity, types, availability, and service quality of literature information resources.

**Keywords:** information behavior; information service; literature information resource guarantee

**Classification Number:** G25

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Improving the guarantee system for academic literature information resources plays a vital role in meeting user needs and promoting high-quality national development and scientific innovation. However, against the backdrop of rapidly increasing yet unevenly qualified academic literature resources and continuously expanding user groups, user demands have become increasingly diversified. Accurately identifying, understanding, and grasping these needs has emerged as an urgent challenge for improving literature resource guarantees. Academic literature information resources constitute the materials that academic personnel read, analyze, reference, and utilize during research activities—documents that carry scientific knowledge, reveal objective truths, and follow established paradigms. The primary users of these resources include researchers and university faculty and students. As graduate enrollment continues to expand, master's students have gradually become the main constituents of this user group. Usage behavior represents the externalization of user needs, and analyzing these behaviors can reveal user demands and provide references for improving academic literature information resource guarantees. Therefore, analyzing master's students' usage behaviors and characteristics of academic literature information resources holds significant importance.

Existing research primarily employs three approaches to understand master's students' usage of academic literature information resources: statistical analysis of library borrowing data, interviews and questionnaires, and citation analysis of

students' published journal articles. However, these methods suffer from notable limitations. Library borrowing data does not have a one-to-one correspondence with master's students' actual demands for academic literature resources, while questionnaires exhibit strong subjectivity. Consequently, there is an urgent need for more accurate and effective methods to achieve research objectives.

Master's dissertation citations represent literature information resources that students have read, cited, and explicitly documented in their dissertations, generally constituting academic literature resources. Analyzing these citations can illuminate master's students' usage behaviors and characteristics regarding academic literature information resources, making dissertation citations a valuable entry point for research. Previous studies have primarily examined various features of master's dissertation citations, such as citation quantity, type, language, and publication date. A few studies have combined citation analysis with questionnaires and borrowing statistics. Nevertheless, these studies exhibit four main shortcomings: (1) research samples are generally small, with most analyzing fewer than 100 dissertations and some only a dozen or so, limiting the representativeness of their conclusions; (2) the time span of samples is short, mostly within three years, lacking long-term longitudinal tracking to reflect changes in usage behavior characteristics; (3) horizontal comparative analysis across different universities is absent, with most studies analyzing dissertations from a single institution; and (4) data analysis tends to be simplistic, relying primarily on basic descriptive statistics that fail to fully reveal the intrinsic connections between dissertation citations and master's students' usage behaviors. Additionally, the analytical indicators established in relevant studies continue to use terms like "citation quantity" and "citation language," lacking standardized nomenclature.

In light of these limitations, this study analyzes citation data from library science master's dissertations completed between 2012 and 2016, examining usage from three perspectives: overall literature usage, usage of different literature types, and usage of different language literature. By comparing usage patterns across different students, different years, and different universities, this research aims to understand the characteristics of master's students' academic literature information resource usage behaviors and provide references for master's dissertation writing and university library resource guarantees.

## Data Sources and Research Methods

This study examines national library science master's dissertations from 2012 to 2016, retrieved from CNKI's China Excellent Master's Dissertation Full-Text Database using the search query "Subject = Library Science AND Year = 2012-2016" on September 6, 2021. The search yielded 710 library science master's dissertations from 32 degree-granting institutions (see [Figure 1: see original paper]). Thirteen institutions had fewer than 10 dissertations and were excluded from the institutional analysis to avoid outlier effects. Additionally, because individual universities had small numbers of students in single years—for ex-

ample, Anhui University had only 6 students in 2015 and 4 in 2016—interval and difference analysis would be statistically meaningless, so such analyses were omitted.

For analytical convenience, this study uniformly uses “items” as the unit for all literature counts. Although books should properly be counted in “volumes” or “copies,” “items” is used consistently throughout. The study aims to identify characteristics of master’s students’ academic literature information resource usage behaviors by constructing an analytical system (see [Figure 2: see original paper]), collecting dissertation citation data, and employing descriptive statistical analysis, non-parametric tests, and interval distribution analysis to quantitatively examine usage behavior characteristics and trends across different universities and time periods. The data processing and analysis workflow is illustrated in [Figure 3: see original paper]. Based on these analyses, combined with literature review, the study examines factors influencing master’s students’ usage behaviors.

## Analysis of Academic Literature Information Resource Usage Behavior Characteristics

### 3.1 Overall Literature Usage Analysis

Descriptive statistical analysis, non-parametric tests, and distribution analysis of master’s students’ literature usage quantities yielded the results shown in – and [Figure 4: see original paper]–[Figure 5: see original paper]. Due to space limitations, non-parametric test results are not presented in separate tables, and institutional statistics only include results from the 19 universities with more than 10 students.

The data reveal that most library science master’s students in China use fewer than 100 items, with usage concentrated in the 30–80 item range. Over time, an increasing number of students are using more literature, though substantial gaps remain among some students, and significant differences exist across universities. Specifically:

From an individual perspective, the 710 master’s students collectively used 44,869 items, averaging 63 items per student. Individual usage ranged from a maximum of 231 items to a minimum of 19 items—a 12-fold difference—indicating substantial variation among students. Interval distribution analysis shows that: (1) most students used 30–80 items, with the highest concentration (23% of students) in the 50–60 item range; (2) between 2012 and 2016, over 70% of students each year used 30–80 items, with 2012 showing the highest concentration in this range, while the number of students using more than 100 items or fewer than 30 items increased over time; and (3) across universities, over 60% of students from each institution used fewer than 100 items, with all students from Northeast Normal University, Central China Normal University, Jilin University, Liaoning Normal University, and Northwest University using

fewer than 100 items, while over 50% of students from Fujian Normal University, Nanjing University, and Nanjing Agricultural University used more than 80 items.

From a temporal perspective, annual literature usage quantities remained relatively stable, though average usage per year showed an increasing trend. No statistically significant differences existed across different years ( $P = 0.128$ ). For example, no significant differences were found between 2012 and 2013 across all universities. Except for Shanxi University, no significant differences were observed across years within individual universities. Shanxi University showed significant differences between its 2012 and 2013 cohorts versus its 2016 cohort ( $P = 0.004$  and  $P = 0.027$ , respectively), with earlier cohorts using fewer items than the 2016 cohort, though no other inter-year differences were significant within Shanxi University.

From an institutional perspective, the maximum average usage per university was 2.3 times the minimum, indicating substantial gaps between institutions. Overall, significant differences existed across universities ( $P < 0.001$ ). However, pairwise non-parametric tests revealed that while most universities differed significantly, some did not—for example, Liaoning Normal University showed no significant differences with Hebei University or Northeast Normal University. Additionally, 2013 showed no significant inter-university differences, while other years exhibited significant differences.

In summary, literature usage quantity reflects both students' resource utilization and their understanding of research developments. Most Chinese library science master's students use fewer than 100 items, with the highest concentration in the 50–60 item range. However, 34% of students use fewer than 50 items, suggesting room for improvement. While quantity should not be pursued blindly, students should aim to enhance the scientific rigor, objectivity, comprehensiveness, and innovativeness of their research through extensive reading. The significant gaps between institutions—for instance, Nanjing University's average of 94 items versus Liaoning Normal University's 45 items—reflect influences from educational quality, library resource development, and individual information literacy, indicating areas for improvement among relevant universities, libraries, and students.

### 3.2 Usage Analysis by Literature Type

Based on relevant classification standards and actual usage patterns, this study categorizes literature into five types: journal articles, books, dissertations, network information resources, and other literature types (including conference papers, newspapers, and standards). Statistical analysis results are presented in – and [Figure 6: see original paper].

The data indicate that library science master's students exhibit clear preferences for different literature types. Most students rely primarily on journal articles, with usage concentrated in the 20–60 item range, while usage of other types

is generally low, mostly within 10 items. However, over time, all types except books showed increasing usage, particularly network information resources and dissertations. Significant differences exist across universities, and substantial gaps appear among individual students in usage of the same literature type.

Regarding journal articles, significant variation exists among both individual students and universities, with average annual usage showing a slight upward trend. Most students' journal article usage concentrates in the 20–50 item range. Annual distribution patterns differed across years, with increasing numbers of students using more journal articles over time. No significant differences were found across years either across all universities or within the same university. However, significant inter-university differences existed both overall and within each year.

For books, substantial variation appears among both individual students and universities, with average annual usage showing a slight decline. Most students used fewer than 10 books, with 74% using fewer than 5 books, though notable usage also occurred in the 10–20 item range. Annual distribution patterns remained consistent, though the proportion of students using fewer than 5 books increased yearly. No significant differences were found across years either across all universities or within the same university. Significant inter-university differences existed overall, though not in 2016.

Concerning dissertations, significant variation exists among both individuals and institutions, with average annual usage showing a slight upward trend. Most students used fewer than 10 dissertations, with 67% using fewer than 5 items. Annual distribution patterns varied, with increasing numbers of students using more than 5 dissertations over time. No significant differences were found across years either across all universities or within the same university. Significant inter-university differences existed overall, and in 2012 and 2013, but not in other years.

For network information resources, substantial variation appears among both individuals and institutions, with average annual usage showing a marked upward trend. Most students used fewer than 10 items, accounting for 68% of the sample. Annual distribution patterns varied, with increasing numbers of students using more than 5 network resources over time. No significant differences were found across years either across all universities or within the same university. Significant inter-university differences existed overall, and in 2012 and 2014, but not in other years.

Regarding other literature types, significant variation exists among individuals, though annual and institutional averages remain relatively consistent. Most students used fewer than 10 items, with 67% using fewer than 2 items. Annual distribution patterns were consistently low. No significant differences were found across years either across all universities or within the same university. Significant inter-university differences existed overall, and in 2012 ( $P = 0.043$ ), but not in 2013–2016.

In conclusion, different literature types possess distinct characteristics in information and knowledge dissemination, and analyzing their usage reflects their value. Currently, Chinese library science master's students show clear preferences: journal articles dominate while other types are rarely used. Both commonalities and differences exist across institutions—for example, Fujian Normal University averages 26 books per student while Liaoning Normal University averages only 3, and Nanjing University averages 21 network resources while Qufu Normal University averages only 3. These patterns reflect the natural attributes of different literature types. However, from a research perspective, comprehensive use of various literature types should be encouraged to ensure thorough data analysis and rigorous research. The fact that some institutions' students rarely use literature types other than journal articles indicates insufficient understanding of diverse resources and may affect research quality. Universities should strengthen relevant education, improve resource development, and encourage students to utilize various literature types to enhance research innovativeness.

### 3.3 Usage Analysis by Language

Between 2012 and 2016, library science master's students primarily used literature in Chinese, English, Japanese, and Russian. Due to minimal usage of Japanese (70 items) and Russian (25 items) literature by only 13 students, these were combined into an “other languages” category. Subsequent analysis focuses on Chinese and English literature usage, with results presented in – and [Figure 7: see original paper].

Overall, Chinese literature dominates, with usage concentrated in the 20–50 item range, while other languages are rarely used and English literature usage mostly falls below 10 items. Over time, English literature usage shows an upward trend, with increasing numbers of students using more than 10 English items. Most universities show no significant differences in Chinese literature usage but exhibit significant differences in English literature usage.

From an individual perspective, substantial gaps exist among students in both overall and language-specific usage. Chinese literature is most heavily used, totaling 31,922 items with an average of 45 items per student and a maximum of 231 items. English literature is used much less frequently, totaling 6,599 items with an average of 9 items per student, ranging from 0 to 137 items. Interval distribution analysis reveals that: (1) over half of students used 20–50 Chinese items (64%) and 0–10 English items (66%); (2) each year, over 80% of students used 20–70 Chinese items, with the proportion using more than 70 items remaining stable at over 10% annually; (3) while the percentage of students using fewer than 10 English items decreased yearly, it still exceeded 50% annually, while the proportion using 10–20 items increased yearly to over 15%, and the proportion using 20–30 items increased from 5% in 2012 to 14% in 2016; and (4) the proportion using more than 30 English items remained stable at 4–6%. These patterns indicate varying distribution patterns across years, with increasing numbers of students using more English literature while Chinese literature

usage remained stable. Over 50% of students at each university used 20–70 Chinese items, though distribution patterns varied across institutions. Except for Nanjing University, Nanjing Agricultural University, Qufu Normal University, Shandong University, Shanxi University, and Tianjin Normal University, over 50% of students at other universities used fewer than 10 English items. Nanjing University, Nanjing Agricultural University, Shanxi University, Qufu Normal University, and Tianjin Normal University each had over 20% of students using more than 20 English items.

From a temporal perspective, total usage across languages varied significantly by year, with 2012 showing the highest totals for both Chinese and English literature and 2016 the lowest—primarily due to fewer students in the 2016 sample. However, average per-student usage reveals minimal differences in Chinese literature across years but more substantial differences in English literature, with average English usage increasing yearly. The highest average usage for both languages occurred in 2016, while the lowest Chinese usage was in 2015 and the lowest English usage in 2012. No significant differences existed across years in Chinese usage ( $P = 0.761$ ), but significant differences were found in English usage ( $P = 0.014$ ), particularly between 2012 and 2016, with the 2016 cohort using more English literature. Anhui University and Guangxi Minzu University showed significant inter-year differences in English usage, while Heilongjiang University showed significant inter-year differences in Chinese usage.

From an institutional perspective, among the 19 universities with more than 10 students, Heilongjiang University had the highest total Chinese literature usage (2,762 items) and Tianjin Normal University the lowest (670 items). Nanjing University and Nanjing Agricultural University tied for highest English literature usage (670 items each), while Yunnan University had the lowest (111 items). Nanjing Agricultural University had the highest per-student averages for both Chinese (64 items) and English (27 items) literature, while Liaoning Normal University had the lowest Chinese average (33 items) and Heilongjiang University the lowest English average (3 items). Universities with average English usage exceeding 10 items included Nanjing University, Jilin University, Qufu Normal University, Shanxi University, and Tianjin Normal University. Overall, significant differences existed across universities in language-specific usage ( $P < 0.001$ ), though some institutional pairs showed no significant differences, such as Yunnan University and Northwest University. Significant inter-university differences in Chinese usage existed in 2012–2015 but not in 2016, while significant differences in English usage existed in all years.

In conclusion, usage of different language literature reflects both the comprehensiveness of literature review and the internationalization level of research. Although some institutions' students use substantial English literature, Chinese library science master's students generally use very little English literature, with some students using none at all—suggesting a research 视野 limited to domestic sources and insufficient absorption of international research findings. While usage patterns follow natural 规律 (Chinese literature dominates), exclusive re-

liance on Chinese literature is detrimental to disciplinary development. Western library science is more mature than its Chinese counterpart and offers much to learn from. Therefore, library science master's students must not limit themselves to Chinese literature but should actively read English, Japanese, Russian, and other language literature to comprehensively grasp international developments and enhance research rigor.

## **Factors Influencing Academic Literature Information Resource Usage Behaviors**

The preceding analysis reveals several characteristics of Chinese library science master's students' academic literature usage: significant inter-university differences in usage quantity, clear preferences for certain literature types, and generally low usage of English and other language literature. These behaviors are influenced by multiple factors related to both users and resources, as illustrated in [Figure 8: see original paper].

### **4.1 User Factors: Educational Background, Information Literacy, Foreign Language Ability, and Research Topics**

Educational quality varies across universities, leading to gaps in students' research capabilities, information literacy, and foreign language proficiency. Significant inter-university differences exist in total literature usage, usage by type, and usage by language, while students within the same institution show relatively similar patterns. For example, over half of students at Nanjing University and Nanjing Agricultural University used more than 80 items, while many at Northwest University and Liaoning Normal University used fewer than 30 items. These patterns demonstrate the important influence of educational background on usage behaviors. Foreign language ability also affects usage of different language literature—students at Nanjing University and Nanjing Agricultural University, who generally have better English proficiency, used more English literature. Additionally, usage behaviors are influenced by students' chosen research topics, including research subject, type, and object. Cutting-edge topics tend to show higher English literature usage and reliance on journal articles with less use of books and dissertations, while mature topics exhibit more balanced usage across types. Theoretically oriented research tends to involve more literature, especially books, while practically oriented research uses more network information resources. Research objects also matter—for example, studying Sino-Japanese library service differences requires more Japanese literature, while studying ancient catalogs requires more books. Universities should strengthen academic norm and information literacy education, while students should develop academic innovation awareness, improve information literacy, and learn to comprehensively utilize various literature access channels based on their research needs.

## 4.2 Resource Factors: Development and Library Services

The quantity of academic literature information resources is increasing rapidly, with growing diversification of types. Different publication types have distinct characteristics in knowledge and information dissemination, leading to substantial differences in usage patterns. Journal articles, with their novel knowledge, broad content, and short publication cycles, can promptly reflect new theories, technologies, and methods in a field, making them the most frequently used literature type. Network information resources, emerging with internet development, are increasingly accessible through various channels, contributing to their growing usage. Currently, library science master's students primarily use electronic bulletins and website news, rarely utilizing other types of network resources. Dissertation usage is also increasing, due to improved quality and quantity from higher education expansion, as well as greater openness and improved database accessibility. The generally low usage of other literature types may relate to disciplinary characteristics—while conference papers represent high-quality research in computer science, this is less true in library science. Beyond resource changes, university libraries, as service providers, significantly influence usage behaviors. Most students' resources come from libraries, whose collection development levels, service quality, and guarantee capabilities determine what resources are available and how they can be used. As university libraries continuously improve their resource development, particularly digital resources, users can access literature beyond temporal and spatial constraints, making utilization more convenient and efficient. Meanwhile, library consortia and resource sharing systems enable financially constrained libraries to share resources, better meeting students' needs. These developments have contributed to the overall increasing trend in literature usage quantity. Libraries should further improve their academic literature resource construction and service systems, proactively embedding themselves in the dissertation writing process to provide more and higher-quality resources that meet personalized needs.

This study has several limitations. First, it only used CNKI's China Excellent Master's Dissertation Full-Text Database as its data source. Although this database offers more comprehensive coverage and better full-text availability than others, it omitted some dissertations. For instance, Wanfang's China Dissertation Full-Text Database contains 645 library science master's dissertations from 2012–2016, 72% of which overlap with CNKI, but includes 181 dissertations not in CNKI, primarily from institutions like University of Chinese Academy of Sciences and Sun Yat-sen University. Second, the study could only conduct preliminary analysis of the reasons behind usage behaviors, lacking in-depth investigation. Third, the analysis focused solely on formal citation features, such as quantitative characteristics of different types and languages, without examining content or utility features like citation quality, citation content, or citation functions. These issues warrant further exploration in future research.

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