

Digital Era College Students' Reading Behaviors, Information Needs, and Library Service Optimization: An Empirical Study Based on Hubei University of Technology

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Abstract: This study aimed to explore the reading behaviors, information needs, and library service demands of college students in the digital era, providing empirical support for optimizing campus reading ecology and library services. A structured questionnaire was distributed to 376 undergraduates and postgraduates from Hubei University of Technology, and data were analyzed using SPSS with descriptive statistics, chi-square tests, and correlation analysis. Results showed a "dual-track" reading pattern of print and digital materials; nearly half of the students read 0-3 print books annually, while 21.81% read over 16 e-books/articles; print books and e-book platforms were the most used carriers (25.60% each); dormitories (35.31%) and libraries (21.98%) were core reading scenes; personal interests (32.20%) and academic needs (19.88%) drove reading choices; 66.75% used AI tools for auxiliary reading; and top library demands included more study seats (20.35%) and expanded print collections (16.93%). It is concluded that universities should integrate online-offline resources, optimize reading spaces and services, and build personalized support systems to address fragmented reading challenges.

1. Introduction

1.1 Research background

The rapid advancement of digital technologies such as the internet, big data, and artificial intelligence has reshaped the information dissemination landscape, profoundly transforming college students' reading behaviors [1]. Traditional immersive print reading coexists with convenient digital reading forms (e-books, online articles, audio-books), making students' reading carriers, scenes, content, and needs increasingly diverse and complex [2]. According to the 20th National Reading Survey, the digital reading rate of Chinese adults has reached 80.1%, and college students, as digital natives, show a more pronounced tendency toward digital reading [3].

However, reading transformation in the digital era also brings challenges: superficial reading, fragmented attention, and difficulties in screening high-quality resources have become prominent issues [4]. University libraries, as core providers of campus reading resources and leaders in reading

promotion, face pressures to adapt to students' evolving reading habits while maintaining their educational and service functions [5]. Hubei University of Technology, a comprehensive local university integrating science, engineering, humanities, and art, its students' reading behaviors reflect both universal characteristics of contemporary college students and uniqueness shaped by disciplinary layout and school positioning. Thus, an empirical study on this group is practically targeted.

1.2 Research significance

1.2.1 Theoretical significance

This study enriches the empirical database on college students' reading behaviors in the digital era by systematically sorting out the multi-dimensional characteristics of local university students' reading behaviors. It reveals the internal connections between reading carriers, scenes, content, and needs, and supplements the deficiency of regionalized and specialized reading behavior research in existing studies [6]. By linking students' reading needs with library service optimization, it expands the application of information behavior theory in library practice, providing a new practical case for its application in higher education [7].

1.2.2 Practical significance

The results can directly guide the optimization of library resources, space, services, and reading promotion in Hubei University of Technology and similar local universities [8]. Specifically, they can help libraries adjust the proportion of print and digital resources, optimize space layout, innovate reading promotion activities, and improve lending processes. Meanwhile, they provide references for universities to formulate reading education policies, build a scholarly campus, and enhance students' reading literacy and comprehensive abilities [1].

1.3 Research hypotheses

Based on existing literature and research background, four hypotheses are proposed:

- H1: Significant differences exist in reading volume, carrier preference, and content selection among students of different genders, grades, and majors.
- H2: Digital reading has become an indispensable part of students' reading lives, with the "print + digital" dual-track pattern dominating.
- H3: Students' reading motivations are diverse, with personal interests and academic needs as core drivers.
- H4: Students' main demands for library services focus on resource expansion, space optimization, and service process improvement.

2. Research methodology

2.1 Research objects

Convenience sampling was used to select full-time undergraduates and postgraduates from Hubei University of Technology. The questionnaire survey was conducted from January to February 2026, with 400 questionnaires distributed and 376 valid ones recovered (effective recovery rate: 94.0%). Demographically, female students accounted for 65.16% (245) and male students 34.84% (131); freshmen made up 50.26% (189), sophomores 17.29% (65), juniors 16.49% (62), seniors 6.65% (25), and postgraduates 9.31% (35); in terms of majors, science and engineering accounted for 40.69%

(153), humanities and social sciences 35.11% (132), art 6.91% (26), interdisciplinary 5.05% (19), and others 12.23% (46).

2.2 Research tools

A self-designed "Questionnaire on College Students' Reading Behaviors and Needs" was used. The questionnaire was developed through literature review [1][4][6], expert consultation (3 library science professors and 2 education associate professors), and pre-survey (n=30) for revision. It included 8 core dimensions and 29 items: demographic information (3 items), reading volume (print and e-books, 2 items), reading carrier preference (7 items), reading scenes and time periods (5 items), reading content selection (6 items), AI-assisted reading tool use (1 item), library use and service needs (4 items), and reading difficulties and support needs (2 items). The questionnaire used a combination of single-choice and multiple-choice questions, with Cronbach's α coefficient of 0.89 (good reliability) and KMO value of 0.87 (Bartlett spherical test $\chi^2=2896.34$, $p<0.001$, suitable for factor analysis).

2.3 Data collection and analysis

Questionnaires were distributed online via WPS Forms through class groups and the library's official WeChat account, with anonymous filling to ensure data authenticity. After collection, Excel was used for data cleaning and coding, and SPSS for statistical analysis: descriptive statistics (frequency, percentage, mean) to describe overall characteristics; chi-square test to analyze differences in reading behaviors among demographic groups; and Pearson correlation analysis to explore relationships between reading time, reading volume, and AI tool use. The significance level was set at $p<0.05$.

3. Results and analysis

3.1 Reading volume and time allocation

In terms of print book reading volume over the past year, 49.20% of students (185) read 0-3 books, 29.52% (111) read 4-6 books, 10.11% (38) read 7-10 books, 3.99% (15) read 11-15 books, and only 7.18% (27) read 16 or more books, indicating an overall low print reading volume among local university students. For e-books (including electronic journals, online articles, and audio books), the distribution was more balanced: 32.71% (123) read 0-3 books/articles, 26.60% (100) read 4-6 books/articles, 13.03% (49) read 7-10 books/articles, 5.85% (22) read 11-15 books/articles, and 21.81% (82) read 16 or more, with the proportion of high-volume e-book readers significantly higher than that of print books.

Regarding weekly reading time (print + e-books), 20.74% (78) spent 1 hour or less, 37.77% (142) spent 1-3 hours, 19.68% (74) spent 3-5 hours, 8.51% (32) spent 5-8 hours, and 13.30% (50) spent 8 hours or more. Cross-analysis showed significant differences by grade ($\chi^2=32.67$, $p<0.001$): The postgraduates (n=35) had the longest average weekly reading time (5.8 ± 1.2 hours), followed by seniors (n=25) (4.2 ± 0.9 hours), and freshmen (n=189) had the shortest (2.8 ± 0.7 hours), which may be related to academic pressure, research needs, and time management skills [7]. The research result is shown in Table 1.

Table 1. Average weekly reading time of college students by grade (M±SD, hours)

| Grade | Sample size (n) | Average weekly reading time (M±SD) |
|---------------|-----------------|------------------------------------|
| Freshmen | 189 | 2.8±0.7 |
| Sophomores | 65 | 3.1±0.8 |
| Juniors | 62 | 3.5±0.8 |
| Seniors | 25 | 4.2±0.9 |
| Postgraduates | 35 | 5.8±1.2 |

3.2 Reading carrier preference

Students exhibit diverse characteristics in their reading carrier preferences. The usage proportion of paper books and e-book platforms (Kindle, WeChat Reading, etc.) is equal, both accounting for 25.60%, followed by online articles (Official Accounts, blogs, etc., 18.57%). Academic journals (paper/electronic) and library electronic databases share the same usage proportion (9.89% each), and audio-books account for 7.58%. This result verifies the dominant "dual-track" pattern [2].

Table 2. Results of Chi-square Test for Differences in Students' Reading Carrier Preferences

| Difference Dimension | χ^2 value | df | p-value | Significant difference |
|----------------------|----------------|----|---------|------------------------|
| Major Difference | 45.32 | 24 | <0.001 | Yes |
| Gender Difference | 18.65 | 6 | 0.009 | Yes |
| Grade Difference | 12.57 | 20 | 0.88 | No |

Note: $p < 0.001$, $p < 0.01$, indicating statistically significant differences, while $p > 0.05$, indicating no significant difference.

Chi-square tests were conducted to examine the differences in reading carrier preferences across majors and genders, with detailed results presented in Table 2. The chi-square test results show that there is a significant major difference in reading carrier preferences ($\chi^2=45.32$, $p < 0.001$): Science and engineering students have the highest frequency of using library electronic databases (15.6%) and academic journals (14.3%); Humanities and social sciences students prefer paper books (32.5%) and literary e-books (28.7%); Art students have the highest utilization rate of online articles (24.2%) and audio-books (12.8%). Meanwhile, there is also a significant gender difference in medium preferences ($\chi^2=18.65$, $p < 0.01$): Females prefer paper books (29.8%) and audio books (9.2%), while males prefer electronic databases (12.3%) and online articles (21.4%).

3.3 Reading scenes and time periods

Dormitories were the primary reading scene (35.31%), followed by libraries (reading rooms, study areas, 21.98%), accounting for nearly 60% of the total; commuting routes (subways, buses, 16.51%), classrooms/laboratories (14.01%), and outdoor places (parks, cafes, 8.31%) were less common, aligning with students' campus life trajectories.

In terms of reading time concentration, 49.80% of students had no fixed time and read randomly, 28.25% focused on reading at night, 15.85% in the afternoon, and only 6.10% in the morning. The high proportion of random reading reflected fragmented reading time, mainly due to heavy course pressure (62.3%), rich extracurricular activities (45.2%), and the need to respond to social information promptly (38.6%) [3].

3.4 Reading content selection and preferences

Personal interests and hobbies were the top criterion for selecting reading materials (32.20%), followed by course learning needs (19.88%), social hot topics (12.12%), research projects/thesis writing (11.74%), teacher/classmate recommendations (8.92%), library popular borrowing lists (6.69%), and career planning/employment guidance (5.14%), verifying the dual core drivers of interest and academic needs [1].

Literary and artistic works were the most popular content type (28.72%), followed by professional academic works (18.20%), historical philosophy (14.30%), social science popularization (13.83%), interdisciplinary expansion (8.98%), and tool skills (6.86%). Among literary works, suspense reasoning (18.83%), online literature (18.30%), and classic masterpieces (17.40%) were the top three subcategories, reflecting a coexistence of entertainment and classic tendencies [4].

For academic reading materials, 44.68% of students had no clear preference and chose on demand, 23.14% emphasized both classics and cutting-edge works, 21.28% preferred classics, and only 10.90% prioritized the latest research results (published in the past 3 years), showing a pragmatic focus on meeting immediate learning and research needs [7].

3.5 AI-assisted reading tool use

A total of 66.75% of students used AI tools to assist reading: 29.52% (111) used them frequently (3+ times/week), 37.23% (140) occasionally (1-2 times/week), 21.28% (80) rarely (1-2 times/month), and 11.97% (45) never used them. The main functions included content summary (68.3%), translation (57.2%), key and difficult point analysis (45.1%), and personalized recommendation (32.6%). Correlation analysis showed a significant positive correlation between AI tool use frequency and weekly reading time ($r=0.32$, $p<0.001$), indicating that intelligent tools played a positive role in improving reading efficiency. The specific distribution of use frequency of AI-assisted reading tools among college students is shown in Table 3.

Table 3. Use frequency of AI-assisted reading tools among college students (n=376)

| Use frequency | Sample size (n) | Proportion (%) |
|-----------------------------------|-----------------|----------------|
| Frequently (≥ 3 times/week) | 111 | 29.52 |
| Occasionally (1-2 times/week) | 140 | 37.23 |
| Rarely (1-2 times/month) | 80 | 21.28 |
| Never | 45 | 11.97 |

3.6 Library use and service demands

In terms of library visit frequency, 30.85% (116) visited 1-2 times/week, 21.28% (80) visited 3+ times/week, 19.68% (74) visited 1-2 times/month, 23.14% (87) visited 1-2 times/semester, and 5.05% (19) never visited, confirming the library's role as a core campus learning and reading space.

The most used library resources/services were reading room/study seats (38.21%), followed by print book borrowing (21.96%) and electronic database retrieval (16.40%), reflecting strong demand for library "space services". Top improvement needs for library resources / service included increasing the number of study seats (20.35%), expanding print collections (16.93%), enriching electronic database resources (14.95%), optimizing the borrowing process (e.g., extending loan periods, 13.40%), and diversifying reading promotion activities (12.67%). The specific distribution of college students' top demands for library resources/service improvement is shown in Table 4.

For new reading spaces, students most desired quiet independent study cabins (28.85%), followed by leisure and comfortable reading areas (with sofas, green plants, 23.24%), themed reading spaces

(15.53%), group discussion rooms (14.98%), and meditation rooms (13.55%), reflecting dual needs for focused and relaxed reading environments.

Table 4. College students' top demands for library resources/service improvement (n=376)

| Service improvement demand | Proportion (%) |
|--|-----------------------|
| Increase the number of study seats | 20.35 |
| Expand print collections | 16.93 |
| Enrich electronic database resources | 14.95 |
| Optimize the borrowing process (e.g., extend loan periods) | 13.40 |
| Diversify reading promotion activities | 12.67 |
| Improve the efficiency of online resource retrieval | 9.84 |
| Strengthen professional library service guidance | 7.98 |
| Other demands | 3.88 |

3.7 Reading difficulties and support needs

The main reading difficulties were lack of sufficient time (25.00%), insufficient concentration (22.22%), difficulty in screening high-quality materials (18.39%), inability to find required resources (print/electronic, 15.61%), and difficulty in understanding obscure content (13.76%), closely related to information overload and fragmented time in the digital era.

Students' support needs included launching reading check-in/incentive mechanisms (e.g., point exchange, honor certification, 19.37%), establishing subject-recommended reading lists (18.39%), offering reading guidance courses/workshops (16.81%), optimizing online reading platforms (16.44%), increasing group reading spaces (14.74%), and providing one-on-one reading consultation (8.89%), indicating a need for systematic support in resource recommendation, method guidance, and motivation incentives.

The digital era brings information overload and fragmented time, which leads to various reading difficulties for college students, and they also have clear demands for reading support. The specific distribution of reading difficulties and support needs is shown in Table 5.

Table 5. College students' main reading difficulties and reading support needs (n=376, %)

| Reading difficulties | Proportion | Reading support needs | Proportion |
|---|-------------------|--|-------------------|
| Lack of sufficient time | 25.00 | Launch reading check-in/incentive mechanisms | 19.37 |
| Insufficient concentration | 22.22 | Establish subject-recommended reading lists | 18.39 |
| Difficulty in screening high-quality materials | 18.39 | Offer reading guidance courses/workshops | 16.81 |
| Inability to find required resources (print/electronic) | 15.61 | Optimize online reading platforms | 16.44 |
| Difficulty in understanding obscure content | 13.76 | Increase group reading spaces | 14.74 |
| Other difficulties | 5.02 | Provide one-on-one reading consultation | 8.89 |
| | | Other support needs | 5.36 |

The data shows that the primary reading difficulty for students is the lack of sufficient time, and the most expected reading support is the launch of reading incentive mechanisms, indicating that students need systematic support in resource recommendation, reading method guidance, and motivation incentives.

4. Discussion

4.1 Core characteristics of college students' reading behaviors

4.1.1 Normalization of the dual-track reading pattern

Print books and e-book platforms were equally preferred, with high-volume e-book readers outnumbering print book readers, consistent with Xian's [2] conclusion of "coexistence of online and traditional reading in the intelligent era." This pattern arises from differentiated needs: print books, with immersive experiences, are preferred for literary classics and professional academic works; e-book platforms, with convenience and timeliness, adapt to fragmented scenes (e.g., commuting) and entertaining reading needs [3].

4.1.2 Significant group differences in reading behaviors

Hypothesis H1 was verified, with significant differences by gender, grade, and major: females preferred print books and audio-books with longer weekly reading time (3.5 hours) than males (2.9 hours), who favored electronic databases and online articles; postgraduates and seniors had longer reading time and higher academic reading proportions, while freshmen had shorter time and more entertaining reading tendencies; science and engineering students valued electronic databases and academic journals, humanities and social science students preferred print books and literary works, and art students relied on online articles and audio-books, reflecting the influence of academic pressure, research needs, and disciplinary characteristics [7].

4.1.3 Diversified motivations and pragmatic needs

Students' reading choices were driven by personal interests (32.20%) and academic needs (19.88%), showing a balance of "interest-oriented" and "academic-oriented" characteristics [1]. In library service demands, students focused on pragmatic needs such as "more study seats" and "expanded collections," with relatively low demand for value-added services like reading promotion activities and resource training, possibly due to heavy academic pressure and limited time among local university students [5].

4.2 Comparison with existing research

4.2.1 Common characteristics

This study shared consensus with previous research by Wang [1] and Cao [4]: the dual-track reading pattern is universal, reading time is fragmented, and in-depth reading is insufficient; library space and resources are core student needs.

4.2.2 Unique findings

Focusing on local university students, this study revealed unique characteristics: overall low print book reading volume (nearly 80% read fewer than 10 books annually), lower than the average of key universities [5]; higher proportion of literary and artistic works (28.72%) and lower proportion of

professional academic works (18.20%), differing from "professional-oriented reading" in key universities [7]; and more prominent shortages of study seats and classic literary works in local university libraries, related to limited resource conditions and disciplinary characteristics.

4.3 Core directions for library service optimization

4.3.1 Resource construction: Precise alignment and integration

Libraries should adjust collection structures to increase purchases of highly demanded books (classic literature, professional cutting-edge works, mental health books) and databases; integrate physical and digital resources to build a "one-stop" retrieval platform; and improve the efficiency of book purchase applications with timely progress updates [1].

4.3.2 Space optimization: Increased seats and diversified types

The library optimizes existing space layouts to expand seat supply by adjusting seating density and using multi-functional furniture; we add diversified spaces such as soundproof independent study cabins for in-depth learning and leisure areas for relaxed reading; and we implement a study seat reservation system and special group discussion areas to avoid mutual interference [3].

4.3.3 Service improvement: Process optimization and activity innovation

The library simplifies borrowing and returning processes, extend print book loan periods (especially for classics and professional books), and implement online renewal; we innovate reading promotion activities such as themed book clubs, online-offline reading sharing sessions, and traditional cultural experience activities to enhance participation; we strengthen resource use training on electronic database retrieval, AI-assisted reading tools, and academic paper writing to improve information literacy [8].

4.3.4 Reading support: Construction of a full-chain support system

The library cooperates with teachers to compile subject-recommended reading lists with guides (e.g., book introductions, reading suggestions); we offer reading guidance courses or workshops to teach intensive reading, extensive reading, and critical reading methods; and we establish incentive mechanisms such as reading credits, check-in activities, and honors/rewards to stimulate enthusiasm, echoing Wang's [1] research on the reading credit system emphasizing guidance and incentives.

5. Conclusion

5.1 Theoretical value

This study systematically investigated 376 students from Hubei University of Technology, enriching empirical research on college students' reading behaviors in local universities. It revealed the dual-track pattern, fragmented time distribution, and group differences of local university students, supplementing theoretical understanding of the impact of digital technology on college students' reading behaviors. By linking reading needs with library service optimization, it expanded the application of information behavior theory in library practice, providing a new theoretical framework for campus reading ecology construction in local universities.

5.2 Practical value

The results offer targeted suggestions for university libraries and reading education policies: libraries should adjust resource allocation, optimize space layout, improve service processes, and strengthen reading guidance; universities should integrate reading education into quality education, offer reading courses, establish incentive mechanisms (e.g., reading credits), and cooperate with libraries to compile recommended lists and organize activities; create a campus reading atmosphere through reading festivals and writer lectures to stimulate enthusiasm.

5.3 Limitations and future research directions

This study had limitations: the sample was limited to Hubei University of Technology with a small size, affecting generalizability; only the questionnaire survey was used, lacking in-depth exploration of students' reading experiences and psychological activities; and the cross-sectional design could not reflect dynamic changes in reading behaviors.

Future research could expand the sample to include multiple local universities in different regions and types; combine mixed methods such as interviews and reading logs for in-depth exploration of psychological mechanisms; adopt longitudinal tracking to investigate changes in reading behaviors at different college stages and evaluate service optimization effectiveness; and explore the impact of reading education interventions (e.g., reading courses, credit systems) on reading behaviors and literacy, providing scientific support for campus reading ecology improvement [8].

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