College Students' Mobile Reading Behavior Under the Information Behavior Framework: A Case Study of the Superstar Mobile Reading App (Postprint)

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Abstract

[Purpose/Significance] Using the Chaoxing mobile reading APP as the research platform, this study explores the behavioral patterns of mobile reading among university students from an information behavior perspective, providing references and suggestions for mobile reading service providers to improve service quality. [Method/Process] With undergraduate students as the research subjects, this study employs questionnaire surveys and in-depth interviews to collect research data, and utilizes statistical tools such as Excel and SPSS to conduct statistical analysis of the survey data. [Results/Conclusion] Currently, mobile reading services provided by university libraries exhibit issues including low usage rates, inadequate resource content to meet user needs, and interactive experiences requiring enhancement. Based on the conclusions of the survey analysis, targeted strategies for improving mobile reading service quality are proposed.

Full Text

Abstract

[**Purpose/Significance**] This study examines the behavioral patterns of mobile reading among university students from an information behavior perspective, using the Superstar mobile reading APP as the research platform. The findings provide references and recommendations for mobile reading service providers to enhance service quality. [**Method/Process**] Undergraduate students served as the research subjects. Data were collected through questionnaire surveys and in-depth interviews, and analyzed using statistical tools such as Excel and SPSS. [**Result/Conclusion**] The study reveals that mobile reading services provided by university libraries currently suffer from low utilization

rates, inadequate resource content to meet user demands, and suboptimal interactive experiences. Based on these findings, targeted strategies for improving mobile reading service quality are proposed.

Keywords: mobile reading; information behavior; college student
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1 Introduction

With the rapid development of broadband wireless access technology and mobile terminal technology, people increasingly expect to access information and services from the internet anytime, anywhere, and even while on the move. To meet this demand, university libraries in China have gradually extended their services to mobile terminals by launching mobile library services. According to the author' s statistics, taking Hunan Province as an example, over 90% of university libraries had activated mobile library services by October 2018. Alongside this development, mobile reading services have become a key focus of information service work in university libraries.

However, relevant studies indicate that mobile reading platforms launched by university libraries generally suffer from low user activity and insufficient utilization of digital resources [1], suggesting that these services fail to effectively meet user needs. University students represent the primary user group for mobile reading services, and their reading behavior constitutes the starting point and foundation for service design. A precise understanding of college students' mobile reading behavior patterns will provide theoretical support and practical guidance for university libraries to promote mobile reading services and improve service quality.

Research on mobile reading behavior has attracted considerable academic attention, yielding substantial findings primarily concentrated in four areas: mobile device cognition and experience, mobile reading habits and preferences, mobile reading motivations, and mobile reading adoption and usage behavior. Regarding mobile device cognition and experience, Y. J. Lan et al. [2-3] analyzed the impact of mobile technology and systems on English learning outcomes. Y. C. Hsieh [4] and Wu Dan [5-6] investigated how different mobile phone screen sizes and reading APPs affect academic literature reading efficiency and compared user experiences across various mobile reading applications. Li Ning et al. [7] examined how mobile reading APP users grant and invoke device permissions.

In terms of mobile reading habits and preferences, demographic factors—including gender, age, education level, professional background, and occupational characteristics—serve as primary entry points for understanding behavioral dif-

ferences among groups. Z. Liu [8] and N. S. A. Karim [9] analyzed gender differences in reading behavior. Gao Chunling et al. [10] conducted differential analyses of individual characteristics in reading needs and behaviors among university faculty and students in mobile environments. Mao Yihong et al. [11-13] systematically analyzed mobile internet users' reading behavior from three perspectives: information seeking, information utilization, and information exchange.

Regarding mobile reading motivations, Cai Shaohui [14] and Tang Mingxiang [15] analyzed digital reading motivations among university students in mainland China and Taiwan, respectively. Li Wu et al. [16] examined college students' mobile reading motivations from a uses-and-gratifications perspective and further analyzed the relationship between motivations and behavior in teenagers' WeChat reading, using Shanghai middle school students as an example. In the domain of mobile reading adoption and usage behavior, Li Wu et al. [17] applied the information systems continuance model to analyze the continuous usage intention of social reading APPs and its underlying mechanism. Chen Juan [18] and Zheng Dejun [19] analyzed factors influencing users' withdrawal intention from mobile reading APPs. Liu Luchuan [20] and Zhao Wenjun [21] examined the impact of perceived value on mobile reading user behavior. Mao Yihong et al. [22] explored the prevalent issue of mobile reading addiction among university students.

Overall, existing research has primarily focused on everyday reading contexts in the mobile internet environment, with relatively few investigations into university students' mobile reading behavior based on mobile reading services provided by domestic university libraries. Furthermore, fundamental theoretical analysis of mobile reading behavior remains insufficient. Mobile reading behavior involves information seeking, utilization, and exchange, and should therefore be grounded in theories of user information needs, behavioral characteristics, and usage contexts. Only by stratifying or classifying mobile reading behavior across different dimensions of information behavior and refining it to the operational level can we comprehensively and systematically grasp the characteristics and patterns of users' mobile reading behavior.

Consequently, this study investigates the mobile reading behavior of university library users, proposes a theoretical framework for mobile reading behavior grounded in information behavior theory, refines behavioral dimensions, designs a survey questionnaire, and conducts a sampling survey of mobile reading users across major university libraries in China.

2 Theoretical Framework for College Students' Mobile Reading Behavior from an Information Behavior Perspective

According to T. D. Wilson' s [23] interpretation, information behavior refers to the activities individuals engage in when identifying their information needs

and searching for, using, and transmitting information in various ways. From an information science perspective, college students' mobile reading behavior based on mobile library services is essentially a form of information behavior involving multiple stages including information needs, information searching, information acquisition, and information utilization. Therefore, we can draw upon information behavior process models to stratify or classify mobile reading behavior, refining it to the operational level.

Scholars have constructed various information behavior process models from different research perspectives. Representative models include D. Ellis' s [24] information-seeking behavior model, C. C. Kuhlthau' s [25] information search process model, and T. D. Wilson' s information-seeking behavior model. D. Ellis divides the information-seeking process into nine stages: starting, chaining, browsing, differentiating, monitoring, extracting, verifying, and ending. C. C. Kuhlthau simplifies information seeking into six stages: initiation, selection, exploration, formulation, collection, and presentation, endowing each stage with new connotations. T. D. Wilson further revised and improved the information behavior model based on D. Ellis' s nine-stage process model.

Domestic scholar Ye Fengyun et al. [26] constructed theoretical frameworks for online academic information query behavior from three channels: academic databases, Web search engines, and specialized academic websites—such as a nine-stage model for academic databases, a seven-process model for Web search engines, and an eight-process model for specialized academic websites. Gan Liren et al. [27] developed a three-stage analytical model of user information search behavior on scientific and technological database websites, refining the search process into initiation, searching, and acquisition stages based on the characteristics of these databases and their users.

Building upon these theories, this study observes college students'mobile reading behavior from an information behavior perspective. Combining the characteristics of users'interaction with the Superstar mobile reading system, we decompose mobile reading behavior into a three-stage, five-process model. The three stages include the initiation stage, acquisition stage, and utilization stage. The behavioral processes encompass information needs, information retrieval, information acquisition, information interaction, and information utilization. Specific behavioral manifestations are shown in Table 1 .

3 Research Methods

This study primarily employed questionnaire surveys, supplemented by observation and interview methods. Data were collected through both field and online distribution of questionnaires, while observations and interviews were conducted with some sample users during the field survey to understand behavioral characteristics in using the Superstar mobile reading system.

The questionnaire was designed based on the theoretical framework presented in Table 1 and divided into two main parts. The first part addressed respon-

dents' socio-demographic characteristics, including gender, grade level, and major. The second part constituted the main body of the questionnaire, covering reading behavior manifestations across five stages: information needs, information retrieval, information acquisition, information interaction, and information utilization, with corresponding items for each stage. Experts were invited to repeatedly revise the questionnaire' s wording and phrasing. A small-scale pilot survey was then conducted, yielding a Cronbach' s Alpha coefficient of 0.810, indicating good reliability.

The formal survey was conducted from March to April 2019, lasting two months. The survey scope focused on universities using Superstar mobile reading services, targeting undergraduate students in the central Chinese cities of Wuhan and Changsha. Online surveys were distributed via Wenjuanxing and promoted through student unions and associations, yielding 1,186 responses. Paper questionnaires were distributed on campus by research team members, with some accompanying interviews, yielding 189 responses. After preliminary screening for validity, 151 invalid questionnaires were eliminated due to incomplete responses or uniform answering patterns. The final dataset comprised 1,224 valid samples, with basic characteristics shown in Table 2 . Cross-referenced with the demographic characteristics of the surveyed campuses, the sample features align well with actual conditions, indicating good representativeness.

4 Data Analysis

4.1 Usage Experience with Superstar Mobile Reading System

Survey data (Figure 1 [Figure 1: see original paper]) show that 58.17% of surveyed college students have used Superstar mobile library for reading, while 41.83% have never used it, indicating relatively low usage of Superstar mobile reading services provided by university libraries. Cross-analysis with demographic characteristics reveals significant differences by grade level (^{2} test), with higher grades showing greater usage rates of the Superstar mobile reading APP.

4.2 Information Needs in Mobile Reading

Among experienced users, statistical data (Figure 2 [Figure 2: see original paper]) indicate that 67.7% of college students primarily use the Superstar mobile reading APP to query borrowing services or collection information. The second most common purposes are utilizing fragmented time for learning (45.9%) and keeping abreast of real-time news and information (42.42%). This is followed by killing time (21.35%), while only a small proportion (17.98%) use it to meet research needs. Cross-analysis with demographic characteristics shows significant differences in information needs by gender, major, and grade level. Males are significantly more likely to select "keeping abreast of real-time news and information," while females are significantly more likely to select "querying borrowing services or collection information." Junior and senior students show

higher proportions of selecting "meeting research needs" compared to freshmen and sophomores.

Regarding resource discovery, 73.03% of respondents experience some difficulty using Superstar mobile library to find reading materials, 5.34% experience great difficulty, and only 19.38% report no difficulty (Figure 3 [Figure 3: see original paper]). In terms of satisfaction with resource fulfillment, 12.92% are very satisfied, 43.54% are satisfied, and 40.45% feel neutral, while dissatisfied and very dissatisfied users account for 2.25% and 0.84% respectively (Figure 4 [Figure 4: see original paper]). These statistics indicate that nearly 80% of users encounter difficulties finding reading materials, reflecting that digital resources on the Superstar mobile reading platform fail to meet the information needs of a considerable portion of users.

4.3 Information Retrieval Behavior

4.3.1 Retrieval Methods and Keywords Regarding retrieval methods, survey data (Figure 5 [Figure 5: see original paper]-Figure 6 [Figure 6: see original paper]) show that users most frequently search by book title (59.83%), followed by subject terms (26.97%), with author searches being least common (13.20%). During retrieval, most users input two keywords (45.79%), followed by one keyword (27.53%), with three keywords and four or more keywords accounting for 15.45% and 11.24% respectively.

4.3.2 Handling of Retrieval Results When search results are not sorted as expected, 44.94% of users employ the system' s filtering function to further sort results, 26.97% "select one by one," and 25.28% conduct "secondary searches" (Figure 7 [Figure 7: see original paper]). If search results do not contain needed information, 57.87% choose to "re-enter keywords for searching," 24.72% select "search in another database," and 15.45% give up searching (Figure 9 [Figure 9: see original paper]). When system output yields numerous results, users commonly sort by book title (48.60%), relevance (47.47%), author (42.13%), subject (41.01%), time (24.16%), and Chinese/foreign language materials (10.39%) (Figure 8 [Figure 8: see original paper]).

4.4 Information Acquisition Behavior

Superstar mobile library provides six information acquisition methods: scan, shake, local import, add OPDS address, subscribe, and WIFI book transfer. Survey data (Figure 10 [Figure 10: see original paper]) reveal that 29.78%-44.94% of users are unaware of these functions, while 31.74%-42.70% have never used them. Only 12.36%-26.12% occasionally use these functions, and 2.53%-6.74% use them frequently. These findings indicate that a considerable portion of users are completely unfamiliar with the auxiliary reading functions provided by Superstar mobile reading system, indirectly reflecting the low usage rate of these features.

4.5 Information Interaction Behavior

During mobile reading, 62.64% of users frequently employ "bookmarking and categorizing" operations, followed by "underlining and annotating" (31.46%), and "commenting and exchanging" (25.28%), while 23.31% perform no operations (Figure 11 [Figure 11: see original paper]). Cross-analysis shows significant gender differences in specific operational behaviors, with males more inclined toward "commenting and exchanging" compared to females.

Superstar mobile library also offers interaction functions including "sharing annotations or notes," "forwarding or sharing reading materials," and "writing book reviews." Survey data (Figure 12 [Figure 12: see original paper]) show that only 24.44% of users occasionally use the "sharing annotations or notes" function, with 4.49% using it frequently, while 23.60% are unaware of this function and 47.47% never use it. Regarding "forwarding or sharing reading materials," 47.19% have never used it, 19.38% are unaware of it, 28.65% occasionally use it, and 4.78% frequently use it. For the "book review" function, 50.28% never write reviews, 16.01% are unaware of it, 29.49% occasionally write reviews, and 4.21% frequently write reviews.

4.6 Information Utilization Behavior

4.6.1 Mobile Reading Networks Survey data (Figure 13 [Figure 13: see original paper]) indicate that college students primarily access Superstar mobile reading APP via mobile communication networks (55.62%), with wireless WIFI accounting for 44.38%.

4.6.2 Mobile Reading Methods During Superstar mobile APP usage, 62.36% of users choose "quick browsing and casual reading," 33.15% select "careful reading," and 4.49% opt for "listening" (Figure 14 [Figure 14: see original paper]). This indicates that shallow reading remains mainstream in mobile reading, with relatively fewer users engaging in deep reading through careful reading.

4.6.3 Mobile Reading Time and Context User sessions with Superstar mobile APP are primarily 11-20 minutes (31.18%), followed by 21-30 minutes (22.47%) and 5-10 minutes (21.91%). Sessions of 31-40 minutes account for 13.2%, 41-50 minutes for 5.62%, and over 50 minutes are less common (Figure 15 [Figure 15: see original paper]). Reading contexts are mainly "when bored at home" (49.16%), "while waiting" (42.98%), "before sleep" (33.71%), and "during transportation" (33.15%) (Figure 16 [Figure 16: see original paper]). Regarding frequency, weekly usage is primarily 3-5 times (35.11%), once (24.44%), and less than once (29.21%), with 5-10 times (7.58%) and over 10 times (3.65%) being relatively rare (Figure 17 [Figure 17: see original paper]).

4.6.4 Mobile Reading Content In terms of content length, 44.94% of users primarily read short pieces, 11.8% mainly read long pieces, and 43.26% read

both equally (Figure 18 [Figure 18: see original paper]). Regarding content carriers, the most popular formats are plain text (65.17%) and text plus images (51.69%), followed by video (28.65%), audio (19.94%), and pure images (7.87%) (Figure 19 [Figure 19: see original paper]). For content forms, users primarily select e-books (71.91%), journals (44.66%), and magazines (36.24%), followed by newspapers (25.56%), news information (27.81%), and dissertations (26.97%) (Figure 20 [Figure 20: see original paper]). Regarding content attributes, users mainly read social news (50.84%), literature/history/military/arts (49.16%), industry information (40.45%), life knowledge (36.25%), and career development/professional knowledge (32.3%), followed by fashion consumption (25.84%), popular culture (28.65%), emotional relationships (16.57%), and family/marriage (7.3%) (Figure 21 [Figure 21: see original paper]).

Cross-analysis reveals significant differences in mobile reading content utilization by gender and grade level. Males show higher selection rates for video and newspaper content, while females prefer plain text and e-books. Freshmen and sophomores select magazines more frequently than juniors and seniors, while juniors and seniors select dissertations more frequently than freshmen and sophomores.

Regarding text formatting, 50.84% of users choose to use the original formatting directly, while 27.25% frequently customize formatting (Figure 22 [Figure 22: see original paper]). Among users who customize, primary adjustments include font (58.25%), brightness (62.96%), font size (59.26%), background (41.41%), and horizontal/vertical layout (30.30%) (Figure 23 [Figure 23: see original paper]).

5 Strategies for Improving Mobile Reading Services Based on College Students' Reading Behavior

5.1 Strengthen Mobile Reading Promotion to Attract Users

Survey results indicate that the penetration and resource utilization rates of Superstar mobile reading services in universities remain low, with only 58.17% of college students having used the service. Interviews revealed that a considerable proportion of students were completely unaware of the library's Superstar mobile reading service. Therefore, university libraries should strengthen promotion through the following measures:

First, improve organizational support and establish multi-party collaboration. Libraries can create dedicated organizational units with internal and external professionals, collaborating with mobile reading service providers, student affairs offices, and publicity departments to form cross-departmental teams responsible for planning, promoting, organizing, and implementing mobile reading promotion activities, thereby ensuring sustainability through organizational and institutional mechanisms.

Second, coordinate online and offline channels to advance mobile reading promotion. Offline activities should include reading salons and special lectures,

with particular emphasis on promoting and training freshmen on mobile reading. Posters and flyers should be displayed on campus bulletin boards. Online activities should feature interactive and personalized network events, utilizing library websites, WeChat platforms, microblogs, and other social network tools for publicity.

Third, build intelligent technology platforms to deepen mobile reading promotion. Based on new-generation information technologies such as cloud computing, the Internet of Things, and big data, libraries should conduct big data analysis of user behavior, context awareness, preference discovery, and personalized recommendation/customization to understand user preferences and interests, make intelligent responses to dynamic user needs, and form systematic and efficient reading promotion models.

5.2 Enhance Resource Content Construction to Meet User Needs

Resource content is key to driving user adoption and use of mobile reading systems. To attract users, mobile reading systems must adhere to a content-first principle, providing high-quality reading content that is genuinely beneficial to readers. Based on survey findings, the following improvement measures are proposed:

First, innovate resource construction approaches through integrated collaboration with publishers and book suppliers. All mobile libraries face issues of limited funding and untimely resource updates. Mobile libraries can optimize and integrate resource allocation by co-building platforms and sharing resources with publishers, book suppliers, and mobile reading service providers to expand resource sources and enrich service content.

Second, according to user reading needs and habits, prioritize providing news information and industry content, supplemented by classic works of literature, history, and military affairs, while actively offering deep reading content for learning and professional development. Based on user preferences for content carriers, plain text should be primary, supplemented by audio, video, and pure image formats. Given that e-books and journals are the most selected publication forms, these should be mainstays, supplemented by academic year papers and newspapers.

Third, given that most users prefer short-form reading, mobile reading content should emphasize short pieces, developing micro-knowledge bases and micro-learning courseware, while also accommodating long-form content. For lengthy content, libraries should segment or divide it according to users' typical session durations, enabling users to select portions that can be completed in one sitting based on their environment and available time [12].

5.3 Optimize Mobile Reading Systems to Enhance User Experience

According to interview results from long-term users, Superstar mobile reading system' s interactive experience is generally inferior to platforms such as QQ Reading and Panda Reader. Mobile reading primarily uses smartphones and tablets as terminals, and its interactive experience is influenced by network environment, interface design, retrieval systems, and demand responsiveness. Based on interview and data analysis results, the following recommendations are proposed:

First, address college students' difficulties in finding reading materials by upgrading information retrieval tools. Advanced search options should be added to basic simple search to improve retrieval efficiency and precision. Retrieval entry points could include borrowing rankings and new book recommendation lists to provide users with reference data for resource selection. Intelligent retrieval technology should be applied to provide personalized information retrieval services based on user profile characteristics and behavioral preferences.

Second, optimize mobile system interface design, including color schemes, graphics, images, layout, and text to provide users with clear interfaces, simple structures, and convenient systems. "Private customization" services should also be offered, allowing users to select interface colors and themes, set frequently used information links and databases, and customize interface styles and functions according to their preferences [28].

Third, given that most students primarily use mobile communication networks to access reading platforms, libraries should cooperate with network operators to provide free wireless WIFI networks for students, reduce network costs, and ensure network stability and coverage. Meanwhile, mobile reading service providers should optimize system planning and design, and conduct regular system maintenance and upgrades to ensure system stability and response time.

Fourth, according to college students' purposes for using mobile reading services, mobile reading service providers should expand system functions by transferring traditional offline library services—including study room location queries, fine and book compensation services, and reader complaints—to mobile terminals to enhance users' perceived usefulness.

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Note: Figure translations are in progress. See original paper for figures.