

Postprint: A Grounded Theory Study of Factors Influencing User Participation in Mobile Library Community Services

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Abstract

[Purpose/Significance] In the new media environment, community-based mobile library services characterized by user-generated content, interactive sharing relationships, self-organized activities, and participatory service design have emerged as a new paradigm of library services. This study explores the influencing factors of user participation in community-based mobile library services from a user perspective, and constructs a theoretical model for such services. [Method/Process] Through semi-structured interviews with 10 respondents, the grounded theory method was employed to analyze and synthesize the interview data, extracting factors influencing user participation and analyzing the pathways of interaction among these factors. [Results/Conclusion] The study ultimately identified four main categories influencing user participation: basic service quality, community-based service value, user community relationships, and participatory service design. Based on these, a theoretical model of influencing factors and their pathways was constructed, which facilitates a user-centered understanding of the development direction for community-based mobile library services and provides reference for mobile libraries to improve their functionalities in resource organization, service updates, and other aspects in the future.

Full Text

Factors Influencing User Engagement in Mobile Library Community Services: An Analysis Based on Grounded Theory

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Abstract

[Purpose/Significance] In the new media environment, mobile library community services characterized by user-generated content, interactive sharing relationships, self-organizing activities, and participatory service design have emerged as a new model for library service innovation. This study examines the factors influencing user engagement in mobile library community services from the user perspective, and constructs a theoretical model of mobile library community services. **[Method/Process]** Through semi-structured interviews with 10 respondents, we employed grounded theory to analyze and summarize the interview data, extracting factors that affect user engagement and analyzing the paths of influence among these factors. **[Result/Conclusion]** The study identifies four main categories influencing user engagement: basic service quality, community service value, user community relationships, and participatory service design. Based on these findings, we construct a theoretical model of influencing factors and their paths of influence, which helps to understand the construction direction of mobile library community services from the user perspective and provides reference for mobile libraries to improve their functions in resource organization, service updating, and other aspects.

Keywords: mobile library; community services; grounded theory; influencing factors; path

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1. Introduction

With the widespread application of digital technology, mobile internet, and smart terminals, mobile libraries have become one of the primary information application platforms for accessing academic information and knowledge and meeting users' reading needs. Compared with traditional library services, mobile library services offer advantages such as extensive and precise information content, efficient and convenient reading experiences, and rapid service model updates. The development of mobile library service models has gradually blurred the physical boundaries of reading behavior—readers' reading activities are no longer limited to simply obtaining information and knowledge, but have evolved into community-based behaviors that integrate reading, commenting, interaction, and sharing. Consequently, mobile library information services have given rise to a new model of community-based services.

Current research on library community services both domestically and internationally has explored relevant aspects. Foreign scholar B. Stvilia [1] considers “community building” as one of the main functions of library social media, enabling libraries to become places where users can obtain research support, learning assistance, and entertainment interest identification. S. W. H. Young [2] points out that examining library social media from a community building perspective can provide new impetus for library services. L. C. Nguyen [3] argues that “community” is one of the core categories in building a sharing library model. Domestic scholar Yang Fan [4] believes that community recipients, readers, and users can actively participate in service processes, thereby forming a systematic knowledge ecological structure. Yuan Hui et al. [5] propose that library knowledge communities based on social network technology will become a new form of library service. These studies indicate that library community services have become a recognized research direction and emerging hotspot both in China and abroad.

However, as a digital service form, mobile libraries can integrate relevant information application technologies in the Web 2.0 environment [3], which is more conducive to meeting user needs for personalized reading, content generation and sharing, social interaction, and autonomous participation. Currently, research findings on mobile library community services are relatively scarce both domestically and internationally. Addressing this research gap, this study approaches from the perspective of user engagement, attempting to answer the following questions: What is the connotation of mobile library community services? What are the factors influencing user engagement in mobile library community services? What are the paths of influence of these factors on user engagement in mobile library community services?

This study obtained extensive research materials through semi-structured interviews and conducted exploratory analysis using grounded theory to deeply analyze the factors influencing user engagement in mobile library community services and the paths of influence among these factors. The findings can help mobile library service providers analyze the construction direction of mobile library community services from the user perspective, providing reference for improving mobile library functions in resource organization and service updating.

2. Related Concepts and Literature

2.1 Social Reading and Library Community Services

In recent years, with the development of digital texts and social media, the concept of social reading has entered public and academic view. Social reading refers to digital reading activities conducted on platforms such as online reading communities, where readers can write annotations or comments during reading, discuss reading issues online with others, and share information and exchange

viewpoints [6]. Readers' strong focus on social interaction and active participation in reading activities reflects the connotation of social reading [7]. As a new reading form, social reading has significantly impacted the core concepts of traditional reading [8] and changed library service concepts and methods.

Compared with social reading centered on sharing and interaction, library community services have undergone further expansion and enrichment in service content and methods. B. Stvilia's [1] research points out that establishing and maintaining connections with library communities is one of the most popular functions of university library social media platforms. S. W. H. Young's [2] study demonstrates that library social media has strong community building capabilities. L. C. Nguyen [3] proposes the concept of a "participatory" library, arguing that libraries need to engage users in core functions and that the core of a "participatory" library is community, empowerment, and experience. A. Harrison et al. [9] concluded through qualitative analysis that "libraries create a promotional and advocacy atmosphere that achieves community building goals." These studies show that foreign scholars emphasize libraries' ability to build communities through their services and value user connection and experience.

Domestically, Yuan Hui et al. [5] believe that library virtual knowledge communities have characteristics such as relative anonymity, resource diversity, system openness, service exclusivity, and interactivity. Tang Xiaoyan [10] combined the interactivity of typical SNS applications with the learning resource platform characteristics of libraries to construct a virtual learning community model. Ren Junhu et al. [11] integrated social networks and virtual communities to construct a mobile library service interaction model in a social network environment centered on user interaction. Zhang Li [12] believes that library information services should learn from the successful model of Reading 2.0 to enhance openness, sharing, participation, and interactivity with users as the center. In the library field, applying social networks can combine library services with social network sharing and deep interaction models, thereby expanding and innovating library services [13]. Domestic research focuses more on building virtual learning communities based on library resources to achieve library service innovation.

2.2 User Engagement

With the rapid development of the internet and mobile internet, today's network users decide which applications to invest their time, energy, and money in based on user experience [14]. Therefore, the key to network applications is no longer concentrated on efficiency, effectiveness, or satisfaction, but on whether they can engage users and provide corresponding experiences [15]. Thus, measuring user engagement is important for understanding user experience quality and evaluating user-centered technology and services [14].

Foreign scholars have conducted research on user engagement relatively early.

“Engagement” is described as a loose interactive state that makes users “want to be here” when using computer applications through cognition, emotion (especially intrinsic motivation), and behavior [16]. User engagement is a multidimensional concept that includes not only behavior (action) but also cognition (thought) and emotion (affect) [17]. H. L. O’ Brien [18] points out that user engagement is an expression of user experience quality that can characterize the positivity of human-computer interaction. User engagement includes six attributes: perceived usefulness, aesthetics, focused attention, felt involvement, novelty, and enduring use [14]. E. N. Wiebe et al. [19] believe that user engagement includes four attributes: focused attention, perceived usability, aesthetics, and satisfaction. N. F. Ibrahim et al. [20] argue that user engagement should be defined as a state of being used, connected, involved, or interested in something.

Based on the above research findings and combined with mobile library community service practice, this study believes that user engagement in mobile library community services is an expression of user experience quality generated during the process of receiving mobile library community services, including enduring use (behavioral aspect), perceived controllability (cognitive aspect), and perceived identity (affective aspect).

2.3 Research Questions on Mobile Library Community Service User Engagement

Mobile library community services are a new service model for mobile libraries based on digital texts and social media applications. Currently, there is no authoritative concept or definition. Based on a synthesis of domestic and international scholars’ viewpoints, this study believes that mobile library community services are a new form of user reading services based on digital resources as information service content and mobile digital reading platforms with social attributes. The service content includes content creation based on cognitive surplus, interactive sharing based on user relationships, online and offline reading activities based on self-organization, and participatory service design based on reading needs. This community-based and mobile service can support user interactivity and information and knowledge sharing, and emphasizes a user-centered service concept.

In the mobile network environment, how to continuously maintain user attraction has posed challenges to library information service innovation [21]. Libraries must continuously strengthen interaction and communication with users in the process of providing information services to better meet users’ personalized needs. From the perspective of community services, user engagement has become one of the criteria for users to measure whether digital technology or network applications are worth spending their time, energy, or money on. Its connotation is not limited to evaluations of the effectiveness, usability, or satisfaction of digital technology or network applications; essentially, user engagement is an expression of user experience quality that reflects the interaction state between people, systems, and environments. Exploring the factors

influencing user engagement in mobile library community services and their paths of influence can help analyze the development direction of mobile library community services from the user perspective and provide better guidance and construction ideas for future mobile library community services.

3. Research Design

3.1 Research Method

Domestic mobile library community services are still in the initial and exploratory stage in practice, with relatively few relevant studies and reference cases. Moreover, exploring the factors influencing user engagement and their paths of influence requires comprehensive consideration of the complexity of user experience. Therefore, this study cannot be limited to the analysis and 梳理 of relevant literature but must conduct more in-depth investigation and analysis. Consequently, this study selected grounded theory as the research method to extract influencing factors based on actual interview materials and reveal the paths of influence among them through logical induction.

Grounded theory is a qualitative research method for building theory based on empirical data [22-23], first proposed by B. G. Glaser and A. L. Strauss [24]. Grounded theory advocates combining researchers' personal experience to collect and compare research data, conceptualizing and categorizing survey data or existing literature through coding, extracting core categories and relationships among categories, and finally forming theories grounded in real data. Its core steps include open coding, axial coding, and selective coding [25].

The research steps are as follows: Select users who are actively engaged in mobile library community services for questionnaire and interview surveys to obtain original data related to their reading behavior; Conduct open coding, i.e., organize and analyze the original data to extract initial concepts, and further categorize them to form initial categories; Conduct axial coding, analyzing the internal relationships among initial categories based on open coding, and gradually develop them into main categories; Conduct selective coding, establishing relationships among main categories, and thus propose the paths of influence between main categories and user engagement. This study follows the principle of theoretical saturation, i.e., when the information reflected by the test group samples can no longer extract new concepts or categories, the theory is considered to have reached a saturated state [26], and relevant theoretical induction can then be carried out.

3.2 Research Sample

To ensure that the interview data from the research sample can comprehensively and objectively reflect the research questions, this study's sample selection followed these principles: Interviewees must be active users of mobile library

applications with deep understanding of mobile reading behavior; Interviewees' education, occupation, and geographical distribution should be relatively random to exclude potential problems caused by homogeneity of the respondent population. Through preliminary questionnaire surveys, this study ultimately selected 10 interviewees, whose statistical information is shown in Table 1 .

3.3 Interview Data Collection

During the data collection process, this study formed a three-person interview team to obtain first-hand research data through in-depth interviews. The interview format involved one-on-one face-to-face or video interviews with each respondent in the research sample, with each interview lasting 20 to 40 minutes. Voice recording was used during the interviews, and the recordings were converted into text files after the interviews, which were then analyzed and organized using the professional qualitative research software NVivo 11.

To ensure the completeness of the collected information, the research team communicated with interviewees in advance via WeChat or email to share the interview outline and schedule interview times. At the same time, to achieve standardization and normalization during the data analysis process, the research team introduced the qualitative analysis software NVivo 11 to assist in completing the data coding for this study. The specific interview outline was as follows:

What is your understanding of mobile library services? What impacts do you think adding social functions such as commenting, discussion, interaction, and sharing to mobile reading applications would have on your reading behavior? How do other users' evaluations of reading content affect your reading behavior? Do you pay attention to other users' "user-generated content" (such as book reviews, "spoiler" summaries, etc.)? What impacts do you think offline activities of mobile reading applications would have on your reading behavior? If you were to propose some suggestions for improving mobile library community services, what would be your thoughts?

4. Analysis of Factors Influencing User Engagement in Mobile Library Community Services

4.1 Open Coding

Open coding is the first step in the grounded theory coding method. This step requires using detailed original data as a basis, assigning concepts to the obtained data, and then, through comparison, extracting more general categories from similar concepts to achieve conceptualization and categorization of the data. This study used NVivo 11 software to conduct coding based on original statements, generating initial concepts. After extracting initial concepts, overlapping concepts were merged, concepts that appeared infrequently (fewer than 2 times) were eliminated, and initial concepts were further summarized,

resulting in a total of 9 categories (B1-B9). The open coding results are shown in Table 2 . To reflect the open coding process, this study lists some initial statements from the interview data.

4.2 Axial Coding

Through open coding of the original materials, this study obtained 9 categories, which were then subjected to axial coding to discover and establish connections among conceptual categories, and to form main categories by analyzing the properties and relationships of the categories. Ultimately, 4 main categories were identified: basic service quality, community service value, user community relationships, and participatory service design. The axial coding process is shown in Table 3 .

4.3 Selective Coding

In the selective coding stage, this study conducted specific analysis on the 4 main categories formed in the axial coding stage, systematically sorting out the relationships between main categories and user engagement in mobile library community services, established the paths of influence among research categories, and finally formed a complete theoretical research model.

The coding results in this stage are shown in Table 4 . This study used randomly reserved initial statements from the interview data for theoretical saturation testing. No new categories or relationships were formed, and the test results showed that the categories in the model had reached a saturated state.

5. Research Findings

This study summarizes the factors influencing user engagement in mobile library community services into four dimensions: basic service quality, community service value, user community relationships, and participatory service design. Based on the selective coding results, the theoretical model of influencing factors and paths of influence for user engagement in mobile library community services is shown in Figure 1 [Figure 1: see original paper]. The research findings and path analysis are as follows:

5.1 The Influence of Basic Service Quality on User Engagement

The study found that users' perception of mobile library basic service quality includes perceived service convenience, perceived reading cost, and perceived content quality. Mobile libraries are essentially the digital presentation and extension of library information services, with the fundamental purpose of meeting users' information needs. From this perspective, maintaining basic service quality is an essential aspect that cannot be ignored in the process of mobile library

service innovation. Li Yuelin et al. [27] point out that in digital library evaluation indicator systems, users first focus on content availability and service sustainability. The interview data in this study also show that in the process of using mobile library services, users first pay attention to the content inventory and quality of mobile library databases, the convenience of information retrieval and acquisition, data compatibility, and user experience during platform use. Therefore, it can be seen that basic service quality is the primary factor affecting user engagement when users choose to use mobile library applications.

Mobile library community services not only provide users with a social reading platform but also serve as an auxiliary service platform for traditional libraries, providing users with digital literature resource query and download services, and carrying out reading promotion functions such as library activity promotion and audio-visual content display. Mobile libraries can actively guide users to participate in community services by providing convenient service methods and high-quality reading content to reduce users' time and energy costs during reading. Therefore, mobile library basic service quality plays a key role in helping traditional libraries bridge the "last mile" of services, establishing user loyalty, and fostering recognition of other community services.

5.2 The Influence of Community Service Value on User Engagement

The study summarizes that the categories corresponding to mobile library community service value include user-generated content value and reading sharing value. One of the most prominent features of mobile library community services is that the library database is no longer the only information provider; original content generated by users during reading has also become an important information source. User-generated content is the product of the combination of users' intellectual capital and library information resources. It is not only an effective way for users to realize their self-reading value but also solves the problem of increased reading time costs under information overload conditions. Additionally, sharing behavior toward user-generated content is an amplification of user-generated content value. With the help of current mobile library digital platforms and various social media platforms connected to them [28], user-generated content can be disseminated at the lowest cost, greatly promoting knowledge transfer and sharing.

From the interview data in this study, it can be seen that users attach great importance to original content during reading. Good book reviews and reading insights often attract feedback and sharing from other users. As the quality of user-generated content (UGC) improves, new users' willingness to read UGC also increases [29], and users can obtain additional reading value from it, thus forming a value flow under virtual relationship networks. In the mobile library community service model, user-generated content value and reading sharing value together constitute mobile library community service value, which plays an important role in helping users establish cognition and engagement with

mobile library community services.

5.3 The Influence of User Community Relationships on User Engagement

The coding results indicate that the main category of mobile library user community relationships corresponds to the categories of building interactive relationships, building convergent relationships, and building strong relationships, among which interactive relationships and convergent relationships belong to weak relationships. One of the foundations for mobile library community services is establishing community relationships among users, including both weak and strong relationships. Interactive and convergent relationships among mobile library users are prerequisites for information sharing among users. Relevant studies show that information sharing under weak relationship conditions faces fewer restrictions and is more conducive to information dissemination and diffusion. Strong relationships among users refer to substantive relationships established in offline practical activities, whose function is to consolidate community identity and belonging and stabilize organizational forms.

The construction of user community relationships can make users feel connected to the library community, enhance their cognition and understanding of other members, promote the formation of reciprocity and trust norms, and thus create opportunities for collective action [30]. User community relationships can help users form a sense of identity with mobile library services and have a relatively important positive influence on user engagement.

Mobile reading community behaviors enable users to form virtual social relationships based on interests and emotions. The communication relationships attached to virtual social networks have changed and reshaped information transmission patterns. Users increasingly attach importance to social activities during reading, gradually forming community organizations based on common interests and needs. Their reading interests, information needs and acquisition methods, information sharing forms and channels, etc., will gradually converge. Users will also gradually establish relationships of mutual recognition and trust. These user community relationships also promote community-based reading.

5.4 The Influence of Participatory Service Design on User Engagement

Mobile library participatory service design refers to proactive mobile library function design activities based on user experience and centered on users. Under current circumstances, the conditions for users to participate in the core work processes of libraries are not yet mature. However, mobile library community services provide channels for users to fully express their user experience, can encourage and guide users to propose suggestions for improving library services, and enable them to participate in certain aspects of service improvement work, giving full play to collective intelligence. Mobile library community services

require not only establishing community models among user groups but also ensuring user participation in service processes to truly realize the user-centered service concept. Participation means that users join in planning library service activities, evaluate these services, and propose improvement suggestions [31]. To achieve participatory service design in mobile libraries, certain social platforms must be attached to build effective channels for user needs expression. Mobile libraries should first focus on cultivating high-quality core seed users, using their influence to form clearly positioned participatory user groups; they can leverage currently mature social platforms to achieve self-organization of user participatory service design; additionally, using big data algorithms to outline different users' reading needs maps is also an effective method for achieving user participatory service design.

Participatory service design can help users establish a sense of controllability over mobile library community services and can have an important influence on user engagement.

5.5 Analysis of Relationships Among Influencing Factors

This study found that basic service quality has a positive influence on community service value, user community relationships, and participatory service design. As analyzed earlier, community service value is built upon basic service quality. Good basic service quality is a key factor for users to choose and continuously use mobile library applications. The interview data in this study show that good mobile library basic service quality can attract more outstanding users, thereby generating more high-quality user-generated content value and reading sharing value. Under these conditions, reading interaction behaviors will produce higher value and better user experience, and will promote the establishment of interactive, convergent, and strong relationships among users. Therefore, improving basic service quality plays an important role in the overall construction of mobile library community services.

The study also found that both community service value and participatory service design are essentially processes of users building their own value. In these processes, value is continuously created and disseminated. User community relationships are important carriers of the entire value flow and are the relational bonds connecting the entire community service. Only by establishing relatively stable user community relationships can stable ecological conditions be provided for users' value creation activities, and can the development and improvement of mobile library service innovation processes be fundamentally maintained. Therefore, this study believes that user community relationships have a positive influence on mobile library community service value and participatory service design.

6. Conclusion

This study aims to explore the influencing factors and paths of influence of user engagement in mobile library community services. Through grounded theory, it constructs a theoretical model, summarizing the influence and paths of basic service quality, community service value, user community relationships, and participatory service design on user engagement, and analyzes the relationships among various factors.

In terms of theory, this study interprets the connotation of user engagement in mobile library community services and constructs a model of influencing factors and paths of influence for user engagement in mobile library community services through the processes of open coding, axial coding, and selective coding in grounded theory. In terms of practice, by analyzing the structural relationships among the four factors of basic service quality, community service value, user community relationships, and participatory service design, it clarifies the interaction paths among various influencing factors, providing practical guidance for the construction of mobile library community service models and future library service innovation.

This study still has certain limitations: First, a large amount of interview data may experience information loss during the organization process, leading to certain deviations in the induction of concepts and categories. Second, the theoretical model proposed in this study and the relationships among various factors need to be tested through further empirical research and corroborated through quantitative methods.

Future research should focus on the following aspects: Case studies and quantitative analysis of user community relationships, which can better promote innovation in library community service models; Focus on community service value, which can better promote users' information and knowledge sharing behaviors and improve national information literacy; Focus on participatory service design, which can guide libraries to provide better personalized services for readers according to their needs.

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

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