

Identification and Analysis of Factors Influencing User Engagement with University Library WeChat Services: Postprint

Authors: Tong Wanju, Shen Junwei

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Abstract

[Purpose/Significance] This study introduces user engagement theory, which emphasizes user interaction experience and emotional investment, to provide a novel approach for enhancing library WeChat service quality and user activity. [Method/Process] Utilizing LDA, answer texts pertaining to WeChat user participation in the Zhihu community were analyzed to extract characteristic words of user engagement; combined with user interviews, influencing factors of user engagement with university library WeChat services were identified, and subsequently, survey data from WeChat users of “Double First-Class” university libraries were obtained for empirical analysis. [Results/Conclusion] The findings indicate that influencing factors of user engagement with university library WeChat services encompass platform content quality, platform system quality, interactive participation awareness, and user perceived value, among which user perceived value exerts the most significant influence, whereas platform system quality does not directly affect user engagement.

Full Text

Preamble

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Identifying and Analyzing the Influencing Factors of User Engagement in University Library WeChat Services

Tong Wanjun¹, Shen Junwei^{1,2}

¹Department of Information Management, College of Information Science and Technology, Nanjing Agricultural University, Nanjing 210095

²Postdoctoral Research Station of Agricultural and Forestry Economy Management, College of Economics and Management, Nanjing Agricultural University, Nanjing 210095

Abstract

[Purpose/Significance] This study introduces user engagement theory, which emphasizes interactive experience and emotional investment, to provide a new pathway for enhancing service levels and user activation in library WeChat services. **[Method/Process]** Based on Latent Dirichlet Allocation (LDA), we analyzed answer texts from Zhihu community regarding WeChat user participation to extract feature words of user engagement. Combined with user interviews, we identified influencing factors of user engagement in university library WeChat services, and subsequently conducted an empirical analysis using survey data from “Double First-Class” university library WeChat users. **[Result/Conclusion]** The study reveals that influencing factors include platform content quality, platform system quality, interactive participation consciousness, and user perceived value, with user perceived value having the greatest impact, while platform system quality does not directly affect user engagement.

Keywords: library WeChat service; user engagement; influencing factor identification; regression analysis

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Libraries’ application of new media to provide convenient, differentiated, and refined information or knowledge services represents an important shift from passively waiting for users to actively integrating into users’ mobile lives. As a representative of new media services, library WeChat platforms combine WeChat’s interactive advantages with libraries’ knowledge content strengths, becoming a mainstream channel for library-user communication. As of November 2018, among the 137 “Double First-Class” universities (referring to China’s initiative to build world-class universities and disciplines), 132 university libraries provided WeChat services, accounting for an impressive 96.4% adoption rate. However, behind this flourishing development, researchers note that many libraries emphasize form over effect, resulting in low user enthusiasm and significant user attrition. Existing studies have addressed this by identifying core functional and technical requirements, analyzing content characteristics of WeChat public account articles, and examining factors influencing user satisfaction and usage intention, thereby informing service optimization. While these studies acknowledge the importance of user perception, deeper analysis reveals that satisfaction metrics cannot capture the depth of user responses to service performance. User engagement theory, which focuses on establishing long-term intimate relationships based on interactive experiences, offers a novel perspective for understanding how library WeChat services can enhance active usage and participation.

This paper reviews relevant research on university library WeChat services and user engagement, applying multiple methods to identify influencing factors of user engagement and exploring solutions to improve service levels and user activation.

2 Literature Review

2.1 Current State of University Library WeChat Services and User Participation Research

Following WeChat's emergence, researchers first analyzed the advantages and disadvantages of integrating WeChat with university libraries. Jiang Bo et al. argued that building mobile library service systems on WeChat—a platform with massive user bases—offers low development costs, flexible functionality, simple customization, and cross-platform support. Conversely, Wang Baocheng et al. noted that WeChat's limited openness restricts personalized functions, while untimely content updates and monotonous service forms constrain user effectiveness. Zheng Dejun et al. pointed out that despite technical limitations of the WeChat platform, university libraries retain autonomy in platform design and optimization. Based on these analyses, libraries have developed WeChat service platforms using public accounts and mini-programs, offering diverse functions including location navigation, book recommendations, reader purchase suggestions, voice-based book searching, reading promotion, library orientation, mobile consulting, subject services, and knowledge services.

While summarizing successful service models, researchers have shifted focus to service effectiveness analysis. As a fundamental platform function, article content has been empirically examined regarding how themes, title length, and posting times affect read and like counts. Studies found that novel, practical columns and articles placed as top stories achieve higher conversion rates. As an innovative library service marketing tool, researchers have used or adapted the WCI (WeChat Communication Index) to evaluate the communication impact of university library public accounts, providing support for improving dissemination effectiveness. Beyond impact evaluation, service quality and user behavior analysis have also been research priorities. Di Yafei et al. empirically analyzed WeChat service quality at Fudan University Library using the LibQUAL model, while Chang Guilin et al. and Sun Shaowei et al. respectively applied expectation confirmation models and information systems success models to analyze factors influencing continuous usage intention of library WeChat public accounts.

Beyond cognitive perspectives of perceived quality and satisfaction, researchers discovered that user participation enhances stickiness with library WeChat platforms. Liu Yueru and Guo Limin developed three interactive functions—"fun quizzes," "closing music appreciation," and "photo walls"—to promote participation. Emotional experiences during platform usage significantly impact participation behavior. Cui Jingfeng et al. and Wei Qunyi et al. constructed indicator systems to evaluate user experience on library WeChat public platforms.

2.2 Current State of User Engagement Research

User engagement theory evolved from concepts including customer engagement, consumer engagement, customer brand engagement, and audience engagement in service marketing. J. Bowden viewed it as a psychological process driving loy-

alty among new and existing customers, R. Thakur considered it a combination of functional, emotional, social, and economic user experiences, while T.H.A. Bijmolt et al. regarded it as behavioral manifestations such as word-of-mouth promotion and value co-creation. In social media and sharing economy contexts, the passive “customer” in traditional transaction management has evolved into an empowered “user” who establishes sustained emotional connections through sharing reviews and exchanging experiences, becoming a value co-creator.

Based on systematic reviews, R.J. Brodie et al. proposed that user engagement is a multidimensional concept encompassing cognition, emotion, and behavior—a perspective widely accepted in academia. V. Kumar et al. identified engagement value components including usage, referral, influence, and knowledge value, while H.L. O’Brien et al. developed a measurement scale and analyzed cognitive evaluation, emotional experience, and behavioral performance in online news searching and browsing. Wang Fang et al. introduced this concept to Chinese library science, defining it as positive cognitive, emotional, and behavioral manifestations during user-library interactions on social media.

The “cognition-emotion-behavior” connotation of user engagement aligns with user behavior trajectories of active usage and participation. However, existing research primarily examines technology firms, tourism virtual communities, and non-transactional online communities, with no studies identifying influencing factors of user engagement in library WeChat services.

3 Identifying Influencing Factors of User Engagement in University Library WeChat Services

This study first analyzed Zhihu community answers regarding WeChat operation and promotion, using LDA to extract feature words reflecting active usage and participation. User interviews with university library WeChat users then assessed the applicability of these features and elicited cognitive, emotional, and behavioral responses, thereby identifying engagement influencing factors to support scale development.

3.1 Extracting User Engagement Feature Words Based on LDA

University library WeChat services rely on the WeChat public platform, so analyzing discussions about other platforms can inform library service development. Zhihu, as an influential Q&A community, aggregates diverse user responses on common topics. Using search terms like “WeChat + participation,” “WeChat + interaction,” “WeChat + operation,” and “WeChat + promotion,” we collected 4,103 relevant answer texts via Python scripts. Following Wang Shuyi et al.’s LDA-based text mining approach, we generated the visualization shown in Figure 1 [Figure 1: see original paper].

Figure 1 visualizes three topics from the 4,103 answers. When Topic 3 is selected, its corresponding circle darkens, and the right panel displays 30 highly relevant

keywords. Light bars indicate overall frequency, while dark bars show frequency within Topic 3. By comparing keywords across topics, we identified unique feature words for each topic, summarized in Table 1 .

Analysis of these feature words reveals that user participation emphasizes both content originality/functionality and aesthetic presentation (color schemes, article layout). Participation channels and platform activity levels also affect interaction frequency.

Although Zhihu answers represent natural language expressions with some semantic redundancy and non-standard phrasing, this naturalness facilitates user understanding during interviews to assess feature applicability. Therefore, we used these feature words directly in subsequent interviews.

3.2 Determining Influencing Factors Through User Interviews

While LDA feature extraction provides preliminary understanding of user concerns, their applicability to library services and additional engagement dimensions required verification through user interviews.

To accurately simulate the development process from initial followership to deep engagement, we selected eight recent university graduates who had never used library WeChat services. In a usability testing format, participants followed 3-4 university library public accounts, used them for a period, then answered interview questions (Table 2). Questions first asked participants to select valued features from the LDA-extracted list, then probed specific usage feelings and behaviors across the three widely-accepted engagement dimensions: cognition, emotion, and behavior.

Through face-to-face and WeChat-based interviews, we collected responses from eight participants: three enterprise employees several years post-graduation, three recent graduates, and two young researchers. Recent graduates demonstrated higher acceptance than long-term employees. Using grounded theory, we conducted open coding of interview transcripts to identify influencing factors (Table 3).

Table 3 shows that platform content quality is the primary and foundational condition for engagement. Users value not only richness but also originality and distinctive features like “seat availability updates.” Platform system quality, though constrained by WeChat’s universal requirements, varies in custom menu design and service details that users perceive as “comfortable” or “concise.” Interactive features like sharing channels and interest groups stimulate participation consciousness. Based on excellent content and aesthetic presentation, user interaction forms perceived value of convenience, driving temporal and emotional investment—a development path aligning with the cognition-to-emotion-to-behavior trajectory.

Notably, participants frequently used the term “attractiveness,” elaborated with words like “trendy,” “hot,” “good-looking,” and “aesthetic.” While attractive-

ness is recognized as a driving force for engagement, our analysis suggests it encompasses both system quality (external) and content quality (internal), making it unsuitable as a separate factor.

4 Empirical Analysis of Influencing Factors

Based on LDA mining and interviews, we identified four influencing factors: platform content quality, platform system quality, interactive participation consciousness, and user perceived value. University library WeChat service engagement represents a long-term intimate relationship formed through user-platform interaction. This process depends first on content and system quality, which awaken interactive participation consciousness and form perceived value, thereby promoting progression from shallow interaction to deep engagement. This relationship structure is illustrated in Figure 2 [Figure 2: see original paper].

4.1 Scale Development

Drawing from the identified factors and existing research, we developed measurement items for platform content quality, platform system quality, interactive participation consciousness, user perceived value, and user engagement. After discussion with one library service professor and five graduate students, plus pilot testing in Nanjing, we refined the scale shown in Table 4 .

4.2 Data Collection and Reliability/Validity Analysis

We targeted “Double First-Class” university users due to their resource richness, service innovation, and high technology acceptance. From January 21-27, 2019, we distributed questionnaires via WeChat groups and library platforms, obtaining 671 responses. After filtering for “Double First-Class” affiliation and eliminating invalid responses from non-users or uniform raters, we retained 316 valid questionnaires.

The sample comprised 137 males and 179 females, consistent with national higher education demographics. Participants came from 32 “Double First-Class” universities across 17 regions, with academic backgrounds concentrated in engineering (40.5%) and management (31.6%). Table 5 presents additional sample characteristics.

Exploratory factor analysis using SPSS 25 on the five-point Likert scale data yielded excellent results (Table 6). All five dimensions showed Cronbach’s alpha coefficients exceeding 0.8, KMO values between 0.772-0.868, factor loadings above 0.6, and cumulative variance contributions over 60%, demonstrating strong reliability and validity.

4.3 Regression Analysis of Influencing Factors

To examine specific effects of the four factors on user engagement, we conducted multiple regression analysis using forced entry method (Table 7).

Tolerance values (0.395-0.531) exceeded 0.01, and Variance Inflation Factors remained below 4, with Durbin-Watson statistic at 1.873 (near 2), indicating no multicollinearity or autocorrelation issues. The model was statistically significant ($F=99.403$, $p=0.000$).

Results show that except for platform system quality ($p=0.293>0.05$), all factors significantly influenced engagement. User perceived value had the strongest effect ($\beta=0.570$), followed by platform content quality ($\beta=0.170$) and interactive participation consciousness ($\beta=0.158$). These three factors explained 56.1% of variance in user engagement, indicating strong explanatory power.

4.4 Discussion of Regression Results

- (1) **User perceived value** emerged as the most influential factor, confirming it as the direct motivational driver of engagement. Wang Xiwei et al. similarly confirmed that perceived value significantly impacts new media platform usage intention. When library WeChat platforms conveniently deliver beneficial information that satisfies needs and facilitates social activity, users develop satisfaction and achievement emotions that drive word-of-mouth recommendations and deep engagement.
- (2) **Platform content quality** and **interactive participation consciousness** also significantly influence engagement. The “content is king” principle dominates new media operations, with library WeChat studies consistently emphasizing originality. Xiang Mengmeng et al. found platform interactivity is key to information dissemination effectiveness, as user interaction reduces physical and emotional barriers to participation. Therefore, maintaining content quality and interactive openness to foster active community atmosphere creates conditions for engagement.
- (3) **Platform system quality** did not directly affect engagement. Given WeChat’s constraints, university library platforms show minimal system interface differences, with primary distinctions lying in article content and presentation form. This suggests libraries should highlight unique content quality within WeChat’s universal framework.
- (4) The three significant factors explained 56.1% of variance, leaving room for additional influencing factors. Since system quality lacks direct effect, future research should further examine relationships among factors.

Conclusion

This study introduces user engagement theory to provide a new perspective for enhancing active usage and participation in university library WeChat services.

Using LDA analysis of Zhihu community texts and user interviews, we identified influencing factors and tested them with “Double First-Class” university users. The developed measurement scale demonstrates good reliability, validity, and explanatory power. Future research should expand to other university types and public libraries to enhance scale generalizability, while deepening understanding of engagement mechanisms and factor relationships to establish theoretical foundations for management systems.

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Author Contributions:

Tong Wanjun: Responsible for paper writing;

Shen Junwei: Responsible for research framework design and revision.

A Study on Identifying and Analyzing the Influence Factors of User Engagement in University Libraries' WeChat Services

Tong Wanjun¹, Shen Junwei^{1,2}

¹College of Information Science and Technology, Nanjing Agricultural University, Nanjing 210095

²The Postdoctoral Station of Agro-forestry Economy and Management, Nanjing Agricultural University, Nanjing 210095

Abstract: [Purpose/significance] User Engagement, which emphasizes interaction experience and emotional investment, can provide a new path for improving the service level and user activation of university libraries' WeChat services. [Method/process] Based on LDA model, this paper extracted the feature words of user engagement from the relevant answers. Then the influencing factors were identified through user interviews. And the multiple regression analysis was conducted on the data collected from Double-First Class universities. [Result/conclusion] The results showed that the influence factors of user

engagement in university libraries' WeChat services are platform content quality, platform system quality, interactive participation consciousness and user perceived value. Among them, user perceived value has greater influence. Platform system quality does not have a direct impact on user engagement.

Keywords: library WeChat service; user engagement; identifying influencing factors; multiple regression analysis

Correction Notice

In the article “Challenges, Dilemmas and Solutions: Re-exploring Fair Use Clauses and Their Application in the Digital Environment” (Authors: Wang Guo, Zhang Libin) published in Vol. 63 No. 10 of this journal, the percentage in Figure 3 [Figure 3: see original paper] was incorrect: “Granting libraries special exemption status” should be 53.91%, not 83.19%. Additionally, in the phrase “Libraries should not seek special treatment on copyright protection issues,” the character “搞” was mistakenly typeset as “摘.” We hereby correct these errors! The electronic version has also been corrected. We thank the reader for pointing this out! The editorial office will be more diligent in the future to reduce errors. We also hope authors will carefully proofread to avoid textual, numerical, and other mistakes!

Editorial Office

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

Source: ChinaXiv — Machine translation. Verify with original.