An Analysis of the Precise Construction of Network Digital Resources (Postprint)

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Date: 2023-08-27T00:00:00+00:00

Abstract

[Purpose/Significance] In the digital academic information environment, the contradiction between users' specialized and personalized needs and the current state of resource construction is becoming increasingly prominent. Based on the concept of precision service, this study explores models and schemes for the precision construction of online digital resources, with a view to providing certain reference and guidance for precision construction work in libraries and other institutions. [Method/Process] Theoretically exploring methods and schemes for precision construction of online digital resources, this study adopts different subscription models to support resource construction work while satisfying universal resource construction, combined with user usage behavior and resource benefits; simultaneously, it conducts further functional design for the online digital resources Hub. [Results/Conclusion] A preliminary scheme for precision construction of online digital resources has been clarified, providing certain reference for precision construction work in libraries and other institutions, and gradually achieving the transformation of resource construction.

Full Text

Precision Construction of Network Digital Resources: An Exploratory Analysis

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Abstract

[Purpose/Significance] In today's digital academic information environment, the contradiction between users' specialized and personalized needs and the cur-

rent state of resource construction has become increasingly prominent. Based on the concept of precision services, this paper explores models and schemes for the precision construction of network digital resources, aiming to provide reference for libraries and other institutions in their precision construction efforts. [**Method/Process**] This study theoretically examines approaches to precision construction of network digital resources. While meeting universal resource construction needs, it incorporates user behavior and resource benefits to support resource construction through different subscription models. Additionally, it proposes further functional designs for a network digital resources Hub. [**Result/Conclusion**] The paper clarifies preliminary schemes for precision construction of network digital resources, providing reference for libraries and other institutions, and gradually achieving transformation in resource construction.

Keywords: network digital resources; precision construction; precision service; digital resources hub
Classification Number: G250
DOI: 10.13266/j.issn.0252-3116.2018.21.004

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2. Current Status of Library Network Digital Resource Construction and Demand for Precision Services

Since the 1960s, the massive publication of journals has outpaced library budget growth, while the physical space required for literature collections has continuously expanded, making it increasingly difficult for libraries to fully meet reader demands and locate information. The rapid popularization of electronic journal full-text databases has solved space and retrieval problems, significantly improving library service efficiency. However, these databases typically adopt whole-collection or subject-package sales models, posing severe challenges to library procurement budgets.

For decades, domestic libraries have lacked standardized procurement systems and mechanisms, with significant variations in their purchasing frameworks. This has made it difficult to balance resource allocation with the complex and diverse needs of users, who must invest substantial time searching for target resources among massive collections. As libraries enter a new era of resource construction transformation, their service philosophy must shift toward "precision." This requires leveraging modern technology to enhance user experience by collecting and analyzing personal information (such as disciplinary background and research fields) and usage data (such as behavior logs and browsing preferences) to monitor, analyze, and predict behavior patterns, thereby enabling precise resource recommendations and personalized "service to the individual."

User demands have become increasingly diversified, complex, personalized, and differentiated. **Diversification** means users need not only traditional journal articles, books, conference papers, technical reports, patents, and standards,

but also scientific data, analytical tools, project funding information, research outcomes, equipment details, institutional profiles, and personnel information. **Complexity** indicates that users require not just information retrieval and full-text access, but also insights into cutting-edge developments, latest achievements, leading scholars and projects, and development trends. **Personalization** demands that libraries provide not only basic services but also tailored, intelligent services based on users' interests and "digital footprints." **Differentiation** reflects profound changes in user behavior, shifting from physically visiting libraries to accessing literature in offices and laboratories, comparing experimental data, and engaging in real-time online consultations.

To fully satisfy these needs, libraries would need to subscribe to more resources. However, user demand intensity and frequency vary significantly across resources. Purchasing everything would be financially impossible, as library budget growth lags far behind resource expansion. Even if budgets allowed, low utilization of certain resources would reduce overall cost-effectiveness. Therefore, libraries must explore more efficient construction models that distinguish between universal resources for general audiences and specialized resources for niche groups, employing different construction approaches to improve both digital resource coverage and cost-effectiveness.

Libraries have begun implementing precision-oriented procurement models such as Patron-Driven Acquisition (PDA) [3], subdivided subject packages, individual journal subscriptions, and Pay-Per-View (PPV), alongside precision services like resource recommendation and push notifications. As early as 2001, Helsinki University Library in Finland used the Liblet system to send SMS reminders about book loans [8], but these services no longer meet current needs. The Shanghai Chongming Library now provides precision services for special user groups—including elderly readers, visually impaired readers, and military personnel—through targeted lectures, "community book houses," book donation programs, and other initiatives [9]. Similarly, the Shanxi Library has offered customized books, homework tutoring, and public talent training for migrant children since 2003 [10], though coverage needs expansion. These examples demonstrate that precision services are becoming essential in modern libraries.

3. Exploration of Precision Construction of Network Digital Resources

Changes in user behavior and demands, coupled with the development of library precision services, require adaptive resource construction models. The rapid growth of network resources has improved information accessibility and expanded the types of resources users need [12]. However, availability lags persist. While platforms like NSTL offer solutions, they involve cumbersome document delivery procedures and delays. Relying solely on commercial PPV models would be prohibitively expensive. Therefore, it is necessary to develop network digital resource construction schemes tailored to individual libraries' circumstances and precision service requirements, ensuring service to individual

users while maximizing cost-effectiveness within budget constraints.

3.1 Process for Precision Construction of Network Digital Resources

The construction process involves several key steps. First, evaluate prospective resources while conducting big data analysis of user needs and behaviors, including reader recommendations and trial/citation usage data. Second, within budget constraints, formulate procurement plans and decide between whole-collection/subject-package subscriptions or precision construction approaches. The precision construction component primarily employs four models: PDA, subdivided subject packages, individual journal subscriptions, and PPV, supplemented by interlibrary loan and document delivery from third-party channels (see Figure 1 [Figure 1: see original paper]). Finally, after appropriate training, users can access and utilize resources. Following cost settlement at the institutional, project team, or individual level, conduct cost accounting and effectiveness evaluation, with dynamic adjustments based on identified issues. Throughout this process, continuous monitoring and utilization prediction are essential.

3.2 Implementation of Precision Construction Schemes

(1) Resource Evaluation and Negotiation: Assess network digital resources (specifically network databases) in terms of resource types, formats, quality, pricing, and access methods. Negotiate trial availability, trial periods, and specific procurement contract terms.

(2) Big Data Analysis of User Needs and Behavior: Track and analyze user search histories, browsing "footprints," download frequencies, and other relevant data, considering institutional user profiles, professional structures, interest preferences, and cognitive needs.

(3) Budget Planning and Assurance: Clarify procurement budgets and flexible funding ranges, estimate allocations among print resources, digital resources, and other types, and predict usage costs for network digital resources.

(4) Selection of Resource Construction Schemes: For universal resources, determine subscription scale and variety. For precision resources, develop construction schemes based on big data analysis of reader needs and precision service requirements.

(5) Selection of Resource Construction Models: Using scientific methods such as linear regression forecasting models, fuzzy comprehensive evaluation methods, and optimal allocation principles from modern economics [13-15], evaluate and compare prospective databases' content, pricing, and usage patterns to preliminarily categorize them for either whole-collection/subject-package subscriptions or precision construction. Databases with significantly high per-use or per-article costs should be considered for precision ordering models. Full-text journal databases with low but relatively uniform usage may adopt PPV; those

with low overall usage but high usage of specific journals may use individual journal subscriptions for high-use titles and PPV for others; databases with usage concentrated in a few journals may subscribe only to those specific titles or their subdivided subject packages.

(6) User Training: Provide training on different precision construction models and techniques for precisely accessing needed resources to improve user competency and service quality.

(7) Cost Settlement, Allocation, and Payment Mechanisms: Settlement typically involves either prepayment or post-payment. Prepayment helps control budgets and prevent overspending but may interrupt access if limits are reached; post-payment has the opposite effect. Given strict budget management, prepayment should be prioritized with continuous monitoring, adjusting budgets or increasing prepayments when necessary to ensure continuous access. For consortium purchases, a "user-pays" allocation mechanism based on usage volume ensures sustainability.

(8) Cost Accounting and Performance Evaluation: Standardize cost accounting based on monitoring results or final expense reports, conducting horizontal and vertical comparisons with similar resources, different procurement schemes for the same resource, and usage costs across institutions to identify prominent issues.

(9) Dynamic Adjustment and Improvement: Use evaluation results to adjust procurement schemes promptly. If precision construction costs exceed expectations, switch to whole-collection or subject-package models; if lower, maintain the status quo. Adjustments should also align with major institutional research directions and projects, identifying new disciplinary fields and core literature to secure through individual journal or article subscriptions.

(10) Continuous Monitoring and Prediction: Establish a monitoring and prediction system for network digital resource usage. Issue warnings for databases with continuously exceeding usage and predict future usage based on current trends and historical data to identify potential anomalies.

3.3 Integration and Precision Services for Network Digital Resources

Implementing precision construction requires resource integration, including commercial resources, open access materials, and special collections. Scholars have compared independent construction versus consortium models for network-born digital resources, proposing optimization recommendations [16]. Mai Xuhui explored digital resource construction and services under the main-branch library model based on "resource co-construction and sharing" [17], while Wei Junjie and others examined the library consortium e-resource group procurement model emerging from this context [18]. Others have proposed new ordering models such as "industry-university-research cooperative digital resource ordering" and "university town joint procurement" [19-20]. All these

models aim to improve cost-effectiveness, increase resource integration and visibility, and enhance user experience by integrating sources and providing multiple access methods including interlibrary loan, document delivery, institutional repositories, and academic social platforms.

Therefore, establishing a Resources Hub represents a viable approach in the current push for precision services (see Figure 2 [Figure 2: see original paper]). To facilitate efficient resource retrieval, the integrated platform could use color coding to indicate accessibility status: green for subscribed or open access resources (direct full-text access), yellow for PPV/PDA-available resources (typically within 2 hours), purple for unsubscribed resources held by other domestic institutions (available via document delivery/interlibrary loan within 4-48 hours or 2-4 days respectively), and red for unsubscribed resources not held domestically but available abroad through professional librarian assistance or academic social platforms. Additionally, the Hub could provide precision recommendations based on user behavior. When users search for literature, the platform could recommend similar commercial or open access resources by the same or other authors based on metadata (author, institution, title, keywords, year). For commercial resources without access rights, it could recommend similar open access alternatives.

4. Summary and Reflection

Based on the concept of library precision services, this paper explores theoretical models and schemes for precision construction of network digital resources. While meeting universal resource construction needs, it incorporates user behavior and resource utilization benefits, adopting different precision construction schemes to support resource development—adapting approaches to specific resource characteristics. The paper further designs Hub functionalities to enhance precision services in libraries and other institutions, providing reference for their precision construction efforts.

The proposed precision construction schemes and service designs require practical testing and refinement. As libraries continuously transform, expand, and enrich their service functions, they must integrate internet thinking from the big data era and explore new ideas, methods, and models to improve resource efficiency, meet specialized user needs, and construct digital resources more efficiently and precisely.

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Author Contributions

Tian Ding: Responsible for literature research and analysis.
Ren Xiaoya: Responsible for literature research, paper writing and revision.
Zhu Jiang: Responsible for research design, paper writing and revision.

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