

Research on the Management Mechanism of Multimedia Resources in University Libraries (Post-print)

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Abstract

[Purpose/Significance] Multimedia resources are one of the key digital resources under active development in university libraries in the information age. Research on multimedia resource management mechanisms is of great significance for the efficient and comprehensive management of multimedia resources in university libraries. [Method/Process] Using literature review, web survey, and case analysis methods, this study investigates the current status of multimedia resource management in university libraries and commercial platforms both domestically and internationally. Through comparative analysis, it is found that the management of multimedia resources in domestic university libraries has remained at a primary stage, with numerous issues such as severe neglect, singular and scarce resource construction, unstandardized organizational management, and incomplete service functions. [Results/Conclusion] Based on the investigation of various multimedia resource platforms, this paper proposes a four-in-one integrated management mechanism with data management as the foundation, organizational management as the overall coordination, functional management as the manifestation, and security management as the safeguard, constructing a systematic management framework. Simultaneously, it identifies key issues in multimedia resource management in university libraries, providing important references and innovative ideas for the management of multimedia resources in university libraries.

Full Text

Preamble

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Research on the Management Mechanism of Multimedia Resources in University Libraries

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Abstract:

[Purpose/Significance] Multimedia resources are one of the key digital resources being developed in university libraries in the information age. Research on the management mechanism of multimedia resources is of great significance for the comprehensive and efficient management of these resources in university libraries. [Method/Process] Using literature survey, network survey, and case analysis methods, this paper investigates the current status of multimedia resource management in university libraries and commercial platforms both domestically and internationally. Through comparative analysis, it is found that the management of multimedia resources in domestic university libraries has remained at a primary stage, with serious problems such as severe neglect, singular and scarce resource construction, unstandardized organizational management, and imperfect service functions. [Result/Conclusion] Based on the investigation of various multimedia resource platforms, this paper proposes a four-in-one integrated management mechanism with data management as the foundation, organizational management as the coordination, functional management as the embodiment, and security management as the guarantee, constructing a systematic management architecture. It also identifies key issues in university library multimedia resource management, providing important reference and innovative ideas for the management of multimedia resources in university libraries.

Keywords: university library; multimedia resources; management mechanism; resource construction

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In addition to traditional literature resources such as books, journals, and special collections, spatial resources like reading rooms and seminar rooms, and hardware device resources such as e-readers, university libraries also possess a large number of multimedia resources including images, audio, and video. Multimedia resources not only provide more information than text but also stimulate readers' interest through diverse presentation formats [1]. With the development of information technology, the volume of multimedia resources has grown exponentially. S.J. Cunningham et al. emphasize that the collection of personal user data in libraries has expanded to include video and other multimedia resources, and that digital libraries should better support personal video materials [2]. The rapid development of information technology and the arrival of the 5G era have provided new technical support for previously management- and promotion-restricted multimedia resources such as images, audio, and video. General Secretary Xi Jinping has pointed out that we should follow the development trends

of the Fourth Industrial Revolution and jointly seize the opportunities of digitalization, networking, and intelligence [4]. Against this backdrop of strong technological and epochal support, multimedia resources are gradually receiving due attention, and university libraries should strengthen the management of multimedia resources to better serve the development of their institutions.

2. Investigation of Multimedia Resource Management Status

2.1 Investigation Plan

The investigation selected three top international universities: Oxford, Cambridge, and Harvard. For domestic university libraries, the focus was on 42 “Double First-Class” universities. Commercial platforms were selected based on three different resource types—images, audio, and video—choosing representative, distinctive, and widely-used platforms. The investigation was conducted as follows: December 1–5, 2019, surveyed publicly available academic literature on multimedia resource management; December 6–12, 2019, conducted case and network investigations of domestic and international university libraries and commercial multimedia platforms; May 14–15, 2020, carried out supplementary case investigations.

2.2 Literature Survey

International research on library multimedia resources originated in 1987 with studies on collection management in school library media centers, arguing that multimedia resource management should encompass both theory and practice, including resource selection, organization, presentation, digitization, and output [5]. E. Cogdell emphasized the important role of multimedia resource management personnel in achieving institutional goals [6], while D. Helmer introduced foundational theories of school library multimedia resource management [7]. In 2012, Indiana University Library and Northwestern University Library collaborated to create an open-source software system for university libraries and archives, enabling easy online access to video and audio collections [8]. In 2016, the Bentley Historical Library also partnered with the University of Michigan Library to enhance interoperability among three multimedia resource management software systems for information management, digital preservation, and repository applications [9], further achieving systematic management of multimedia resources.

Domestic research on multimedia resource management began in 2003 when Tsinghua University Library built a Web-based multimedia resource query system [10]. In 2007, scholars Ren Ping et al. introduced the practice of Tsinghua University Library’s multimedia resource management and service platform [11]. Regarding multimedia resource management, scholars such as Cai Xiuhua [12], Ai Xiaoma [13], Feng Jun [14], Wang Xiaodan [15], and Meng Haihong [16] conducted relevant research. Wang Xiaodan argued that multimedia resource

management service platforms should support multiple data formats and meet shared resource needs, while Meng Haihong believed that multimedia resource use platforms should be improved by increasing interactivity and avoiding copyright disputes. In terms of multimedia resource services, Zhang Chunhong et al. [17] proposed characteristics of new multimedia services based on academic needs in a network environment; Li Yang [18] argued that multimedia resource services should be networked, diversified, and experiential; Zhai Yarui et al. [19] and Xu Li [20] both proposed that multimedia resource reading promotion should be well-implemented; Tang Yong et al. [21] and Li Ling [22] pointed out that the “visibility” of multimedia services should be enhanced by organically combining online and offline service methods.

2.3 University Library Case Studies

2.3.1 International Investigation Multimedia self-built management platforms in top international university libraries focus primarily on image construction, while audio and video databases are mainly provided by database vendors. International university library multimedia resource management exhibits three major characteristics: (1) Rich and extensive resource construction, especially in self-built multimedia platforms, which not only include library collections but also collaborate with other institutions to display historical culture, landscapes, geographical maps, manuscripts, music, and other multimedia resources from various countries, regions, and the university itself. (2) Strong emphasis on standardized processing of multimedia resources. For example, Cambridge University Library’s Archivio di Etnografia e Storia Sociale della Lombardia database promotes the establishment of shared cataloging related to the latest international standards by creating archives equipped with dynamic cataloging systems that coordinate classification systems used by different cultural institutions. (3) Copyright protection is placed in an important strategic position. For instance, Harvard University Library’s ExploreCollections has strict requirements for viewing images online, requiring permissions to access them, while Cinemas of India not only promotes Indian films through a Video on Demand (VOD) platform but also charges for some copyright-restricted resources.

2.3.2 Domestic Investigation A preliminary investigation was conducted on the multimedia resource construction and management of 42 “Double First-Class” university libraries, with statistical results shown in [Figure 1: see original paper]. Thirty libraries, including Beihang University, source their multimedia resources from commercial databases such as Changxiangzhixing’s accompanying resource database and KUKE Digital Music Library. Among them, 18 libraries, including Renmin University of China, categorize existing multimedia commercial data in resource navigation and database navigation, but with different classification methods—some categorize images, audio, and video as three separate types, while others directly classify them as “multimedia.” Five libraries, including Peking University, have built self-developed multimedia databases or platforms around specific themes, demonstrating prominent

thematic characteristics and distinctive features. Four libraries—Tsinghua University, Beijing Normal University, Xi'an Jiaotong University, and Chongqing University—have built their own multimedia resource management platforms for collection, management, and service of library multimedia resources.

[Figure 1: see original paper] Statistics on multimedia resource management in 42 “Double First-Class” university libraries

The investigation examined four aspects of self-built multimedia resource platforms in representative domestic university libraries: resource content, management standards, functional permissions, and platform features.

- (1) **Resource Content Construction:** Fudan University focuses on seal impressions as the primary construction resource, with a clear theme and distinctive features, but relatively single type and small quantity. Tsinghua University and Beijing Normal University focus on local library collections, online courses, and CD/tape resources, which are richer in type than Fudan University but lack distinctive features. Chongqing University’s “+Collection” platform primarily builds multimedia resources on school history, major events, and campus life uploaded by official school organizations and individual users, demonstrating diversity and university characteristics but lacking resources to support learning and research.
- (2) **Resource Metadata Management Standards:** Fudan University and Chongqing University have relatively standardized and unified metadata descriptions, but Tsinghua University and Beijing Normal University have vastly different metadata descriptions for different types of resources.
- (3) **Resource Access Permissions:** Fudan University’s Seal Impression Literature Virtual Library is freely open to the public. All users can preview multimedia resources on Tsinghua University and Beijing Normal University’s platforms, but downloads are restricted to campus IP ranges. Chongqing University’s “+Collection” service platform does not restrict resource viewing, but users must register and bind their reader cards to access other functions, and authorization must be submitted for resource download and use.
- (4) **Platform Function Construction:** Except for Chongqing University, which has interactive functions and simple personalized functions, the other three university libraries basically only have basic functions such as search, classification navigation, preview, download, and new resource recommendation.

2.4 Commercial Platform Investigation

Based on platform characteristics, representativeness, and audience reach, three commercial multimedia platforms—Tencent Video, NetEase Cloud Music, and Visual China—were investigated across four dimensions: resource content, function construction, copyright management, and personalized services.

- (1) **Resource Content:** In addition to their respective primary resource types, all three platforms also cover other resource types. For example, Visual China supports not only music and video but also provides font libraries. In terms of resource sources, besides obtaining copyrights through commercial cooperation, all three platforms support user uploads. Tencent Video allows every user to upload videos in their personal center, while NetEase Cloud Music and Visual China require application or contract signing.
- (2) **Function Construction:** In addition to basic functions such as search, navigation, playback, and download, platforms have also built comprehensive recommendation functions, personal management functions, and interactive functions. Platforms support not only hot topic recommendations but also personalized recommendations based on users' search results and browsing history. They also support users in collecting and organizing multimedia resources of interest and viewing related records in their personal centers. Tencent Video's Doki community and NetEase Cloud Music's hot comments and Cloud Village create online communication platforms for users.
- (3) **Copyright Management:** Multimedia resources on Tencent Video, NetEase Cloud Music, and Visual China can only be downloaded and used with authorization, with strict regulations on copyright duration. Resources with VIP privileges on Tencent Video and NetEase Cloud Music can only be used during the VIP validity period after download. Visual China's free resources, after download, require copyright purchase for any use other than personal learning, research, and appreciation.
- (4) **Personalized Services:** In addition to supporting users in managing their favorite resources, Tencent Video and NetEase Cloud Music also support users in customizing page settings and playback settings. For example, NetEase Cloud Music's blacklist function allows users to avoid certain musicians or songs.

3. Current Status of Domestic University Library Multimedia Resource Management

3.1 At a Primary Stage

The management of multimedia resources in China's university libraries remains at a primary stage, manifested in three aspects: (1) In theoretical research, top international university libraries no longer limit themselves to theoretical-level studies of multimedia resource management but focus more on practical research, while domestic research has not yet formed a systematic theoretical framework. (2) In resource construction, over 70% of domestic university libraries choose to directly purchase and use commercial multimedia databases, neglecting the integration of existing multimedia resources and the construction

of school-characteristic resources. In contrast, international universities attach great importance to this aspect of resource construction. For example, Cambridge Digital Library prioritizes the management and display of the university's treasured collections, local geographical maps, and other multimedia resources. (3) In service management, over 50% of self-built multimedia resource management platforms in domestic university libraries only have basic functions such as keyword search, classification navigation, preview/playback, and download. Compared with existing literature resource service functions like commenting, collecting, and sharing, it is evident that multimedia resource service function construction and management are still in their infancy.

3.2 Singular Resource Content Construction

According to the investigation of multimedia resource construction and management in domestic university libraries, only 21.43% have built self-developed multimedia resource databases. These self-built databases fall into two categories: (1) Single-theme multimedia resource databases, such as Peking University's Beida Lectures special resource, Fudan University's Seal Impression Literature Virtual Library, and Nanjing University's micro-video resources. While thematically clear and easy to manage, each platform's resources appear singular and monotonous. (2) Multimedia resource management platforms built in cooperation with commercial companies, mostly focusing on book-accompanying CDs, online course resources, and similar materials. Compared with the resource content construction of top international universities' self-built image databases, these are singular in type and lack distinctive features. For example, Oxford University's Digital Bodleian platform not only builds art collections of the university but also collaborates with other institutions to build art works and manuscript materials with profound historical heritage.

3.3 Unstandardized Organizational Management

The investigation of self-built multimedia resource management platforms in domestic university libraries reveals that current organizational management of multimedia resources is unstandardized in both metadata management and resource classification management. In metadata management, Beijing Normal University Library's multimedia resource service platform has four types of resources: book-accompanying materials, tapes, courseware, and videos, yet the metadata describing these resources varies significantly in detail. Book-accompanying resources have relatively complete metadata due to the completeness of book metadata, while video resource metadata only includes click counts, with no unified standard for multimedia resource description. In classification management, there are problems of overly general categories and single search methods, basically limited to keyword and navigation searches. However, due to overly general categories, navigation search results are not accurate. Additionally, the investigation found issues with non-standardized user permission management. For example, the online cultural exhibition hall of Ocean Univer-

sity of China displays artworks and photographic works without corresponding copyright statements for download and use, allowing even visitors to download them. Such non-standardized permission management undoubtedly increases resource security risks.

3.4 Incomplete Service Functions

Compared with top international university libraries and commercial platforms, the service functions of self-built multimedia resource platforms in domestic university libraries still lack recommendation, interactive, and personalized service functions. Although Tsinghua University Library's non-book resource service platform has a special recommendation function, supporting personalized resource recommendations on the homepage and providing related resource recommendations matching target search resources on the download interface, the recommendation content only includes two items and is not well-developed. The lack of interactive and personalized service functions is a common problem in almost all domestic university library multimedia resource service function construction and management. Only Chongqing University's "+Collection" service platform has interactive functions such as collection, liking, following, reporting, and sharing, but it still lacks personalized service functions such as personalized recommendations and preference settings.

4. Countermeasures for Domestic University Library Multimedia Resource Management

4.1 Data Management as Foundation

Currently, multimedia resources in university libraries are distributed dispersedly. The first step is to collect multimedia resource data for unified processing and storage. Data collection sources include: (1) Local library collections; (2) Multimedia resources on university history, major events, characteristic courses, and lectures obtained from other university organizations such as colleges, university history museums, and news websites; (3) Multimedia resources independently uploaded by faculty and students. Collected multimedia resource data must undergo standardized processing before storage and circulation. Standardized processing involves describing multimedia resources according to certain metadata standards for unified and standardized description to facilitate retrieval and utilization [23]. Multimedia resource data storage includes both multimedia resources and related metadata. To ensure data storage security and avoid risks such as data loss and leakage, data storage should have multiple approaches, including local storage, cloud backup, and offline hard disk backup. The specific process of multimedia resource data management is shown in [Figure 2: see original paper].

4.2 Organizational Management as Coordination

Current organizational management of multimedia resources in university libraries suffers from chaotic and non-standardized management. To manage multimedia resources more effectively and securely, hierarchical management should be implemented, as shown in [Figure 3: see original paper]. Basic organizational management includes resource review, classification, and release, handled by junior librarians with third-level permissions. Intermediate management mainly includes task management, personnel management, and log management, directly handled by middle managers with second-level permissions. The highest-level management is permission management—having the power to set management permissions with first-level permissions, while also possessing second- and third-level permissions, handled by senior managers.

4.3 Function Management as Embodiment

Currently, the service function construction of multimedia resources in university libraries is singular. However, multimedia resource service functions are not only an effective embodiment of multimedia resource data management and organizational management but also the only way for readers to directly experience library multimedia resource management services. Therefore, university libraries should attach importance to the management of multimedia resource service functions. Multimedia resource service function management mainly includes resource display, classification navigation, resource promotion, resource sharing, social management, personalized services, and multi-terminal version support. Among them, multimedia resource display and classification navigation functions are the most direct embodiment of effective multimedia resource management. Multimedia resource promotion is the focus of function management. To make better use of multimedia resources, university libraries should consciously cultivate users of multimedia resources [24]. To promote knowledge exchange and sharing and respond to the call for open data sharing, resource sharing is an essential link in multimedia resource management. Social interaction management, personalized service management, and multi-terminal version support can enhance reader experience, increase user stickiness, and improve the service functions of university library multimedia resources.

4.4 Security Management as Guarantee

Both domestic and international libraries and commercial platforms place the security management of multimedia resource data in an important strategic position. In the storage 环节, resources should be stored with highly secure technical means to avoid risks of resource data loss and guard against human theft, intrusion, and leakage of resource data. In the management 环节, strict permission settings should be used to implement hierarchical management of multimedia resource operations, reducing risks of multimedia resource abuse and leakage. In the circulation 环节, the main risks are copyright disputes and infringement issues brought by the opening, sharing, and utilization of multimedia

dia resources. Therefore, corresponding security management measures should be strictly adopted according to copyright authorization to ensure the copyright security of multimedia resources.

4.5 System Architecture

Multimedia resource data management, organizational management, function management, and security management can be constructed into a complete, systematic management architecture, as shown in [Figure 4: see original paper]. Resource data management is the foundation of systematic multimedia resource management. Organizational management and function management advance layer by layer based on resource data management. Security management, as the guarantee of resource security, runs through the entire management mechanism and has different roles and embodiments in data management, organizational management, and function management.

5. Key Issues in University Library Multimedia Resource Management

5.1 Enriching Resource Construction

The core of multimedia resource management is resources. Constructing and providing multimedia resources is the essential work of university libraries and the core capability for supporting university development and serving readers. Both domestic and international university libraries and commercial multimedia institutions place resource construction in an important strategic position. Therefore, the management of multimedia resource construction is particularly important.

5.1.1 Integrating Existing Resources In addition to purchased commercial multimedia databases, university libraries have many precious multimedia resources: (1) Book-accompanying CDs, English or music tapes, video and audio recordings of important events, and images that have been kept in the library. These multimedia resources should be digitized and integrated. (2) Characteristic courses, lectures, and other multimedia resources should be integrated and centrally managed. Existing library self-built multimedia resource platforms have already built these two types of resources, but they are incomplete and need further improvement. (3) Special collections of ancient books and paintings can also be managed after digital processing to widely disseminate traditional culture without damaging the original resources. For example, Fudan University's Seal Impression Literature Virtual Library, based on the donation of renowned epigraphy scholar Lin Zhangsong, gathers collections from many sources to build a professional database showcasing seal impression culture, as shown in [Figure 5: see original paper].

5.1.2 Building Characteristic Resources Multimedia resource construction in university libraries should have university characteristics. For example, Cambridge University's Cambridge Digital Library includes campus landscapes and the university's and local region's historical and geographical map materials as part of its resource display, as shown in [Figure 6: see original paper]. To create multimedia resources with university characteristics, libraries should actively cooperate with other university organizations, other universities, museums, science and technology museums, and local organizations. Chongqing University Library's "+Collection" service platform cooperates with other universities in the Chongqing area to achieve resource sharing, which not only enriches multimedia resources but also promotes cultural knowledge exchange among universities.

5.1.3 User Dual Role of "Use + Construction" Users not only have the right to enjoy and use multimedia resources but also have the responsibility for multimedia resource construction and management. A distinctive feature of NetEase Cloud Music is providing users with a platform to publish cover songs and original music, encouraging users' innovative spirit while also enriching platform resources and creating differentiated advantages in market competition. Video resources on Douyin Short Video are uploaded by users, who are both the main users and main builders of video resources, greatly enhancing user participation and sense of achievement. Libraries should grant users both the right to access and utilize multimedia collection resources and the management authority to participate in co-building and reviewing multimedia resources, transforming users from their previous single role of merely using resources to a dual role of "use + construction." This transformation can not only increase user participation and enhance user responsibility but also enrich library multimedia resources and increase their completeness and diversity.

5.2 Standardized System Management

5.2.1 Systematic Review and Standardized Cataloging To ensure that resource content meets library collection requirements and eliminate violent, sensitive, pirated, and other illegal resources, university libraries should establish a rigorous systematic review mechanism in resource management. Taking multimedia commercial platforms as references, Douyin has established a "machine + manual" dual review mechanism where machines compare video titles, screen titles, and keywords with content blocking databases to determine violations. If suspected violations are found, they are manually reviewed [27]. Standardized cataloging involves describing multimedia resources using standardized metadata standards to better organize and classify them for user retrieval and acquisition. Cambridge University's Biblioteca Virtual del Principado de Asturias platform uses the Dublin Core Metadata Initiative ISO 15836 encoding scheme to describe bibliographic information [28].

5.2.2 Hierarchical Permission Management Hierarchical permission management is not only a basic guarantee for reducing security risks of multimedia resources in management but also an important support for protecting user rights. Manager permissions can be divided into different levels, with each level corresponding to different management powers and responsibilities. Users have three types of permissions: resource viewing, utilization, and uploading. All users can view platform resources upon entry, resource utilization requires submitting authorization applications and stating purposes, and resource uploading requires real-name authentication. Hierarchical permission management means not only that managers strictly implement hierarchical permission systems in management for more orderly and secure management work but also that user usage processes should be managed hierarchically, clarifying users' access, download, and utilization permissions to avoid improper phenomena such as resource abuse and misappropriation.

5.2.3 Security Guarantee Mechanism Although the above hierarchical permission management can ensure resource data security and copyright security to a certain extent, data security issues emerge endlessly, urgently requiring a complete security guarantee system to maintain the storage security, content security, and copyright security of multimedia resources. For storage security, Docker virtualization technology [29] can be used during storage to achieve container isolation, separate storage of precious documents, and cloud disaster recovery backup. For content security, a rigorous content review mechanism can be established. For copyright security, an intuitive and standardized hierarchical authorization system can be adopted. For example, QQ Music formulates corresponding authorization methods based on different copyright requirements of music resources, such as music only released as digital albums that users can only listen to and download after purchase.

5.3 Multi-scenario Adaptation

5G features high speed, low latency, and massive connectivity [30], providing technical support for transmitting large-capacity data and accelerating the transformation of people's reading habits toward fragmentation and convenience. Readers need not only to use library multimedia resources in fixed locations but also to access resources through mobile terminals [31]. Commercial platforms such as Tencent Video and NetEase Cloud Music support multi-terminal access, including mobile clients, WeChat mini-programs, computer clients, and web pages, adjusting page layouts and service functions according to different terminal characteristics while achieving data interoperability across terminals. Chongqing University Library's "+Collection" service platform supports access through mobile clients, WeChat mini-programs, and web pages, and has initially achieved data interoperability, as shown in [Figure 7: see original paper]. Developing mobile terminals such as APPs and WeChat mini-programs for convenient access in university libraries not only helps promote multimedia resources and improve utilization rates but also aligns with users' reading habits and enhances

their experience.

5.4 Continuous Service Function Optimization

University libraries should not be limited to improving basic functions of multimedia resource services but should also enrich service functions, including recommendation, interactive, and personalized service functions. Resource recommendation is an important way to promote multimedia resources and improve utilization rates. The main recommendation mechanisms of commercial multimedia platforms such as Tencent Video, NetEase Cloud Music, and Visual China include hot resource recommendations, new resource recommendations, category recommendations, user behavior-based recommendations, and commercially cooperated resource promotions. Current resource recommendation methods in university libraries include hot recommendations, new resource recommendations, and category recommendations, but their application scope is narrow, with only a very few libraries such as Tsinghua University Library, Beijing Normal University Library, and Chongqing University Library applying them to multimedia resource recommendations. Interactive functions are a basic need of modern people in the mobile Internet environment [32]. If university libraries cannot meet reader needs in a timely manner, they will fall further behind commercial information institutions. Top international university library multimedia resource platforms all support multimedia resource sharing. Harvard University's ExploreCollections platform also provides a real-time communication window with librarians, and Harvard's Cinemas of India platform supports rating multimedia resources. Personalized services are provided to meet users' personalized needs. Users can manage resources and information according to their own habits and preferences. For example, users can add custom tags and private notes when using multimedia resources in Oxford University's Digital Bodleian and manage them in their personal center.

5.5 Enhancing Promotion Awareness and Perfecting Promotion Mechanisms

The long-term lack of systematic management of multimedia resources in university libraries, combined with readers' long-established literature usage habits, has resulted in low utilization rates of multimedia resources. Therefore, university libraries need to assume the responsibility of promoting multimedia resources. Libraries should establish and strengthen awareness of multimedia resource and platform promotion while building corresponding and perfect promotion mechanisms. In addition to existing literature resource reading promotion mechanisms, they can learn from commercial multimedia platform promotion methods, such as cooperating with other platforms and holding competitions or large-scale events. For example, Qingdao Library and Xinhua Bookstore jointly held the first Qingdao National Book Recommendation Video Competition to promote reading [33]. This format not only promotes resources but also builds competition entries into new resources, enriching resource content, as seen in

Chongqing University Library's "Campus VLOG Competition," which not only promoted the multimedia platform and resources but also attracted a large number of users to upload resources.

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Author Contributions

Xu Tiancai: Conceived the paper topic and main structure.

Feng Tingting: Constructed the specific framework, conducted literature survey, and wrote the paper.

Pan Yuting: Conducted case investigations and proofread and revised the paper.

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

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