

Re-examining Libraries and Library Science in the New Era: Also on the Return to Fundamentals of Library Science Education in the Post-Print Era

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Abstract

Purpose/Significance The new era endows libraries with new missions, necessitating a renewed understanding of the characteristics of library development in the new era, constructing a theoretical framework for library science, and clarifying the direction of educational reform and training objectives for library science in the new era. **Methods/Process** Using comparative analysis and systematic analysis methods to synthesize and summarize traditional libraries versus new-era libraries, as well as traditional library science versus new-era library science. **Results/Conclusion** The fundamental issue in new-era library development concerns service capability: transitioning from resource capability to service capability, from traditional service capability to new-type service capability, and constructing a new-type service capability system. In the new era, the research paradigm of library science must undergo a full spatiotemporal shift, promoting continuous transformation of the library science disciplinary system across dimensions including disciplinary characteristics, research objects, development models, core competencies, technical methods, and disciplinary attributes.

Full Text

Preamble

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Rethinking Modern Libraries and Library Science—With Discussion on Returning to the Originality of Library Science Education

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Abstract:

[Purpose/Significance] The new era has endowed libraries with new missions, necessitating a reexamination of the characteristics of modern library development, constructing a theoretical framework for library science, and clarifying the direction of reform and training objectives for library science education in the new era. [Method/Process] This paper adopts comparative analysis and systematic analysis methods to summarize and conclude traditional libraries versus modern libraries, as well as traditional library science versus modern library science. [Result/Conclusion] The fundamental issue in modern library development is the problem of service capability: transitioning from resource capability to service capability, from traditional service capability to new service capability, and building a new service capability system. In the new era, the disciplinary research paradigm of library science requires a full spatiotemporal shift, promoting continuous transformation of the library science disciplinary system from disciplinary characteristics, research objects, development models, core capabilities, technical methods, and disciplinary attributes.

Keywords: modern library; modern library science; service capability; library science education

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1. Basic Understanding of Modern Libraries

1.1 Industry Concerns About Library Survival

In October 2017, M. Hoon, a contributor to JobNetwork (the largest job search website on the internet), published an article titled “8 Jobs That Won’t Exist in

2030” in the Employment Trends column, ranking librarian as the number one disappearing profession [1]. Hoon pointed out that as more people choose to download e-books on tablets and Kindles, physical book borrowing is no longer popular. On November 7 of the same year, internet writer S. Phillpott published an article titled “13 Disappearing Jobs That Won’t Exist in 2030” in the Choosing a Career column, ranking librarian third among future disappearing jobs. Phillpott attributed this to the fact that although books will continue to exist and e-readers like Amazon’s Kindle are currently quite good, some public libraries are struggling to operate due to funding issues. In the context of the digital age, libraries and those helpful, knowledgeable librarians are gradually becoming obsolete [2].

Since the late 1970s, the renowned American library and information scientist Lancaster pointed out in his work “Information Retrieval Systems” that electronic media would replace paper-based information, and humanity was rapidly and inevitably moving toward a paperless society. In 2011, B.T. Sullivan, a user education librarian at Alfred University, wrote “2050 Academic Library Autopsy Report,” arguing that academic libraries’ lives would be unsustainable and setting their extinction deadline at 2050 [3]. The “library extinction theory,” characterized by collecting paper materials, has indeed made people feel that libraries face the danger of disappearance.

There have always been three voices regarding the future development of libraries: library extinction theory, library crisis theory, and library decline theory. In a sense, whether Lancaster or Sullivan, although they added considerable worry, tension, and anxiety to the library community, they also sounded the alarm and issued warnings.

1.2 Redefining the Library

Accompanying transformation and change in the information field, people’s understanding of libraries has also undergone tremendous change, triggering the industry’s movement to redefine libraries. The British Library attracted global attention with its strategic plan titled “Redefining the Library” (2005-2008) [6], sparking a global redefinition movement across various types of libraries. Subsequently, the University Leadership Council published “Redefining the Academic Library” in 2011, exploring how to manage the migration of digital information services mainly from the perspectives of utilizing digital collections, rethinking digital publishing models, redefining library spaces, and reallocating librarian resources [7].

Domestic scholars have also proposed constructive ideas for redefining libraries. Chu Jingli pointed out that the scientific revolution has triggered information explosion, and people’s channels for acquiring knowledge increasingly favor the internet and mobile internet, while dependence on traditional libraries gradually weakens. Future libraries are no longer a concept of a “building,” but are constantly transforming toward information centers, knowledge centers, and in-

novation centers [8]. Ke Ping believes that libraries are social organisms that promote people's acquisition, dissemination, and utilization of knowledge through a series of business activities such as collection, organization, preservation, and transmission of documents and information, fulfilling multiple functions including culture, science, education, communication, and intelligence [9]. Director Wu Jianzhong pointed out that libraries are currently in an exploratory stage transitioning from old paradigms to new ones. Libraries should proceed from the three elements of "people," "resources," and "space," highlight the role of people in libraries, integrate all-media resources, explore the value of libraries as spaces, and expand modern libraries' knowledge services from three aspects: "front line," "back office," and "beyond" [10].

1.3 Libraries Entering a New Era

General Secretary Xi Jinping pointed out in the 19th National Congress report that socialism with Chinese characteristics has entered a new era [11]. As society enters a new era, libraries must keep pace with the times and inevitably enter a new era as well.

1.3.1 Basic Positioning of Modern Libraries Accompanying the continuous transformation of library forms, the main contradictions of libraries constantly shift, and libraries' service capabilities must continuously improve. Modern libraries are user demand-oriented, relying on the coexistence of physical libraries, digital libraries, and smart libraries, actively integrating into the front line and embedding into processes to provide knowledge services and smart services that meet users' new demands. See Figure 1 [Figure 1: see original paper].

1.3.2 Evolution of Library Forms From the evolution of library development, libraries have roughly experienced three stages: (1) Paper library and physical library stage. This stage was driven by on-site service demands, where libraries satisfied users' needs for on-site services. In the physical library era, users had to come to the library to access documents, and libraries mainly provided on-site document services. (2) Digital library and mobile library stage. With the development of digital technology and mobile communication technology, the era of digital libraries and mobile libraries has arrived. This stage is driven by network service demands, and libraries satisfy users' needs for network information services. Users can cross temporal and spatial boundaries to access library digital resources and mobile resources anytime and anywhere through computers or handheld mobile devices. (3) Smart library and intelligent library stage. With the development and application of IoT, intelligent agents, and big data technologies, smart libraries and intelligent libraries have begun to emerge as new library forms. This stage is driven by knowledge service demands, and libraries satisfy users' needs for intelligent knowledge services. The problem to be solved is how to better provide intelligent services and smart services. See Figure 2 [Figure 2: see original paper].

Libraries need not only to satisfy users' needs to access documents on-site or through networks but also to provide personalized solutions based on the document, information, and knowledge needs of users who do not come to the library. For libraries, service is fundamental. The evolution of library forms is essentially about changes in service capability—namely, how to extend and expand from traditional service capability to new service capability.

1.3.3 Main Characteristics of Modern Libraries Modern libraries possess five main characteristics: (1) Library form—Libraries Beyond Libraries. Libraries refer not only to physical buildings and spaces but also include digital libraries, mobile libraries, smart libraries, and intelligent libraries. “Library” is a complex library system that organically integrates multiple forms. (2) Library resources—XML-based digital resource organization. Library resources are the foundation and increasingly exist in digital form. The problem libraries need to solve is how to organize, reveal, and associate these digital resources, mine data, and then provide knowledge discovery services. The core of modern library resources is scientific data, linked data, domain platform construction, and semantic knowledge organization. (3) Library services—Knowledge services oriented toward users' implicit and potential needs. Knowledge services aim to provide digital knowledge solutions that integrate into the front line and embed into processes. Users need solutions, not just clues and retrieval methods for obtaining documents. Libraries have not yet better achieved knowledge services. Knowledge services depend on the complete digitization of resource forms to organize and effectively mine digital resources, conduct knowledge association and knowledge discovery. (4) Librarians—Expert librarians providing professional knowledge services. The capability requirements for modern librarians are research-based service and service-based research. So-called service-based research means librarians' research is service-oriented, not pure academic research; so-called research-based service means librarians provide knowledge services based on research. Good services depend on systematic scientific research and solid academic foundations. Expert librarians must have solid professional foundations, subject service expertise, and the ability to solve users' complex problems, and be able to provide solutions according to user problems. (5) Library function—Capability-driven institutions from resources to services. The more important criterion for modern libraries is their capability to serve users, especially the capability to provide new services. Modern libraries are not resource-driven institutions or building-driven institutions but capability-driven institutions. Libraries should not only have resources and service venues and spaces but also play the functions of data-type, intelligence-type, think tank-type, smart-type, and intelligent-type libraries.

1.3.4 Primary Contradictions of Modern Libraries Different periods have different primary social contradictions. In 1981, the Sixth Plenary Session of the 11th Central Committee proposed that the current social contradiction in China was between the people's growing material and cultural needs and back-

ward social production [12]. On October 19, 2017, the 19th National Congress report proposed that socialism with Chinese characteristics has entered a new era and emphasized that China's primary social contradiction has transformed into the contradiction between the people's growing needs for a better life and unbalanced and inadequate development [13].

Similarly, the contradictions of libraries are also constantly transforming in different periods. The primary contradiction of traditional libraries was between users' document needs and insufficient document resource guarantees. Although library resource acquisition funds increase year by year, the number of collection documents can never satisfy users' growing document needs. The primary contradiction of modern libraries has transformed into the contradiction between users' needs for new library services and insufficient library service capabilities. This transformation occurs because library resources are gradually guaranteed through digital resources, and the primary contradiction is no longer a resource issue. Users do have needs for libraries, but these needs are not only manifested in documents but more in users' needs for services, especially new services. However, libraries still have a considerable gap in new service capabilities.

In such a contradictory state, libraries currently and in the future face many challenges: (1) limited library infrastructure to cope with higher social expectations; (2) limited resource guarantees to cope with widespread information needs; (3) limited staff to cope with professional occupational requirements; (4) limited technology application to cope with changing information environments; (5) limited service capabilities to cope with complex service demands.

1.4 Capability Transformation of Modern Libraries

1.4.1 Changes in Library Capabilities Traditional library service capabilities mainly include document management, reference consultation, in-library services, interlibrary loan and document delivery, digital resource management, reading promotion, information literacy education, institutional repository construction, intelligence analysis and research, and digital and mobile library services. The new era endows libraries with new missions, and libraries should continuously expand new capabilities, including knowledge organization, knowledge consultation, embedded services, open access resources and services, data management and services, knowledge discovery, pan-information literacy education, library publishing and publishing services, think tank research and services, and smart and intelligent libraries [14]. See Table 1 . Undoubtedly, moving from traditional capabilities to new capabilities is an important manifestation and transformation of library capability improvement.

1.4.2 New Service Capability System Modern libraries need not only service capabilities but also new service capabilities. Accompanying the transformation of library capabilities from traditional to new service capabilities, the modern library new service capability system is continuously improving from document services to smart services. This system includes document services,

network services, mobile services, subject services, data services, OA services, publishing services, think tank services, and smart services. Correspondingly, librarians' identities and positions are also constantly changing, such as subject librarians, data librarians, OA librarians, communication librarians, copyright librarians, publishing librarians, think tank librarians, and smart librarians. The emergence of new librarian positions is also a recognition and manifestation of librarians' capabilities. Therefore, modern libraries need to promote the construction of new service capabilities, and librarians should earnestly strengthen their own capability cultivation to avoid losing at the turning point. See Figure 3 [Figure 3: see original paper].

1.5 Professional Characteristics of Modern Librarians

1.5.1 Traditional Services and Librarian Characteristics Traditional library services include document acquisition, cataloging and classification, circulation and reading, document retrieval, reference consultation, and reading promotion. Librarians correspondingly possess traditional service capabilities. The professional characteristics of librarians are mainly in-library work, related to documents, providing document services. Librarians play an intermediary role between users and documents, and their work is transactional and technical. The job content does not require high levels of discipline, professional knowledge, or capability.

1.5.2 New Services and Librarian Characteristics Library new services rely on subject services and intelligence services, continuously expanding the height, depth, and breadth of services, including embedded subject services [15], knowledge consultation, intelligence analysis and research, data management and services [16], library publishing and publishing services, think tank research and services [17], and smart and intelligent services [18].

The professional characteristics of modern librarians are directly facing user needs and user processes. Librarians need to have high education and high quality, engaging in knowledge-based, creative, and value-added services. Librarians have non-intermediary relationships between users and documents, establishing partnership relationships with users. Among modern library expert librarians, those engaged in professional services can become intelligence experts or knowledge management experts in certain subject areas.

1.6 Fundamental Issues of Modern Libraries

The fundamental issue of modern libraries is to solve the primary contradictions of libraries, and its essence is the service capability issue. Service capability is a comprehensive manifestation of the interaction of various library elements. For modern libraries, demand determines existence, and service determines success or failure. Modern libraries most need to transform from resource capability to service capability and from traditional service capability to new service capability [19]. Libraries should face user needs and transform various elements

into services: strengthen resource construction and effective development and utilization, accelerate technology introduction and application, cultivate more professional technical talents and provide stages for them to display their talents, emphasize space reconstruction, give play to space functions, increase funding input and maximize its effect. See Figure 4 [Figure 4: see original paper].

2. Reunderstanding Modern Library Science

Traditional library science considers libraries as intermediaries, and librarians as intermediaries. Intermediary theory is a product of the traditional library era. Traditional libraries are marked by print collections, physical libraries, and on-site document services. In the era of internet, mobile internet, social networks, search engines, and artificial intelligence, if we stubbornly adhere to the “intermediary” theory, libraries will inevitably be bypassed by users and eventually replaced. Modern libraries are not only intermediary institutions but also engines of the knowledge and information society; libraries are not only treasure houses of knowledge but also fountains of knowledge; librarians are not only intermediaries but also partners in user processes. Only by breaking through the ideological constraints and theoretical framework of “intermediary” will libraries and library science have real opportunities and space for development and greater achievements [20].

2.1 Building a New Collaborative Relationship Between Library Science and Information Science

Library science is a discipline that studies the emergence and development of library undertakings, the organization and management of documents, and the laws of library work. Information science is a discipline that studies the general laws of intelligence generation, processing, transmission, and utilization, as well as the basic principles of intelligence system management [21]. Libraries are institutions that emerged at a certain stage of human document and information exchange development to effectively promote such exchange. Library science and information science have always had a close relationship, not only belonging to the same first-level discipline but also having much crossover and overlap in research content, while in past cognition they were often independent and isolated from each other. From the perspective of library science, information science is sometimes characterized as deinstitutionalized library science. Libraries are an application field or context of information science. Library science needs information science, and information science also needs library science. Modern library science and information science need deep cross-integration and need to build a new collaborative relationship. Library science needs to strengthen its relationship with information science and enhance intelligence capabilities to ensure healthy disciplinary development.

2.2 Shifting the Disciplinary Mindset from Resources to Services

The library community has never stopped discussing “the relationship between resources and services.” Some experts believe that resources are king, services are the queen (foundation), and technology is the maid (tool). In the era of digital networking and knowledge services, the relationship between resources and services needs to be reexamined. Our viewpoint is: demand-oriented, resources as the foundation, technology as the wings, and service as the king. Demand is fundamental, resources are the foundation, technology is the means, and service is the value. Modern libraries need to shift from “resources are king” to “services are king,” from “library-centered” to “user-centered,” from “services determine demand, resources determine services” to “demand determines services, services determine resources,” and from “demand determines existence” to “service determines success or failure,” achieving real transformation and transition of libraries.

2.3 Establishing Knowledge Service as the Disciplinary Core Competency

The core competencies of modern library science include: (1) The ability to analyze, excavate, stimulate, and satisfy user needs. Without understanding user needs, library services lack effectiveness, and provided services are blind. User needs research is the foundation of library science research. (2) The ability to transform documents, information, and data resources into knowledge, intelligence, and wisdom. Merely possessing resources is insufficient; the potential value of resources needs to be transformed into the real value of services, achieving the sublimation from resource capability to service capability. Knowledge organization research is the key to library science research. (3) The ability to embed explicit and tacit knowledge with users’ explicit and tacit needs. Both information resources and librarians’ expertise manifest as explicit and tacit knowledge, while user needs also manifest as explicit and implicit. Only when the three parties are organically matched can the potential of knowledge be maximally released. User behavior research is the core of library science research. (4) The ability to directly participate in user processes as collaborators. Librarians’ role is to construct new relationships with users by being placed in users’ contexts, scenarios, and task environments. Only when librarians become collaborators of users will they be accepted, recognized, and praised. Embedded collaborative research is fundamental to library science research. (5) The ability to intelligently and wisely solve user problems creatively. Meeting user needs is where library value lies, requiring the use of librarians’ wisdom and intelligent technology to better satisfy users’ deep knowledge needs. Knowledge service is the ultimate goal of library science research.

2.4 Spatiotemporal Shift in Library Science Research Paradigms

Modern library research orientation should shift from “library-centered” to “user-centered.” If we compare libraries to Earth and users to the Sun, the

“geocentric theory” is the traditional library science research paradigm, while the “heliocentric theory” is the modern library science research paradigm. See Figure 5 [Figure 5: see original paper]. The “geocentric theory” emphasizes buildings, collection size, funding, and staff numbers, emphasizes service rules and standards, considers libraries as the service front line, and emphasizes providing services to in-library readers. The “heliocentric theory” emphasizes the services provided to users and their effects, values humanization and humanistic spirit. Laboratories, research groups, teaching and research offices, and conference rooms are the service front line—where users are, services are there [22].

Promoting the spatiotemporal shift of library science research paradigms means shifting from institution-centered to user-centered, from resource-centered to service-centered, from simple and extensive to in-depth and refined, from users entering libraries to librarians entering users, and from labor-intensive to intelligence-intensive. Ultimately achieving: service content intellectualization, service methods integration, service means intelligence, service space virtualization, service venues ubiquity, and service effects satisfaction.

3. Direction of Modern Library Science Education Reform

3.1 Reform of Modern Library Science Disciplinary System

Modern library science education faces both great opportunities for innovative development and many challenges for transformation and upgrading [23]. The core of the library, information, and archives disciplinary system and capability is information and data [24]. Changes in the library environment and user needs have prompted the redefinition of libraries and also promoted the transformation of the library science disciplinary system. The core of constructing the library science disciplinary system is information and data, with modern library capabilities such as document management and services, information collection and organization, intelligence research and analysis, digital publishing and services, think tank research and consulting services, and data analysis and services as the main course content. The library science disciplinary structure should include disciplinary basic theory, knowledge of this discipline and related disciplines, methods of this discipline and related disciplines, data analysis and intelligent technology, and management knowledge and capabilities. See Figure 6 [Figure 6: see original paper].

The continuous transformation of the library science disciplinary system is mainly manifested in: disciplinary attributes shifting from humanities and social sciences-dominated management disciplines to management disciplines co-dominated by humanities and technology; disciplinary characteristics shifting from library-centered to user-centered disciplinary systems and paradigms; research objects shifting from document organization and management to organization and management of digital objects (information, data, knowledge); core capabilities shifting from document query and retrieval to data analysis and

knowledge discovery; technical methods shifting from document organization as the main body to information science, computer science, data science, and intelligent science as the main body; development models shifting from library and information personnel capability-dominated to dual-driven by user needs and information technology.

3.2 Training Objectives for Modern Library Science Education

In the new era, digital, network, and intelligent technologies and environments have promoted the disciplinary positioning of libraries to move from documents to data, knowledge, intelligence, and wisdom, continuously empowering “Information.” Library science deeply cross-integrates with management disciplines and computer disciplines, deepening library science research content and enhancing library science development momentum. New technology applications also promote the integration of various related disciplines in library, information, and archives management, breaking down disciplinary barriers, and the trend of collaborative and integrated development of library, information, and archives management is increasingly evident.

Whether libraries survive or become extinct does not depend on people’s speculation and prediction but depends on what capabilities libraries and librarians possess, and what capabilities and academic discourse power library science professional education and talent cultivation possess. This will enable library science to gradually move from a soft discipline to a hard discipline with strong applicability and broad influence, establishing a theoretical, methodological, technical, and application innovation system and characteristics adapted to the times.

In terms of professional construction and curriculum design, five major connections should be emphasized: (1) organic connection among training levels including undergraduate, master’s, doctoral, and postdoctoral; (2) organic connection among education, research, practice, methods, and technology; (3) organic connection between the library and information field and related disciplines; (4) organic connection between national policies and training unit characteristics; (5) organic connection between universities and employers.

The fundamental issue of library development is service capability. If libraries possess good new service capabilities, they will not become extinct. Some propose humanities to save libraries, others propose technology to save libraries. Our viewpoint is that capability saves libraries, and innovation saves libraries. Similarly, library science disciplinary construction and professional education also depend on their own capability building and library career development. Library science education needs to cultivate new professional technical talents for the library cause, and library science theory should form a synchronous and interactive development relationship with library practice to construct modern library science theory. In the new era, library science theory, education, and practice need to establish a new relationship of collaborative development and

continuously strengthen their own capability building to adapt to the needs of modern libraries and library science development.

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The Rethinking of Modern Library and Modern Library Science— —With the Discussion of the Return to the Originality of Library Science Education

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Abstract: [Purpose/significance] New era has put forward new mission for libraries, requiring rethinking the features of modern library development, constructing the theoretical architecture of library science, and clarifying the transformation direction and training objectives of library science education in the new era. [Method/process] This paper adopts comparative analysis and systematic analysis methods to summarize traditional libraries and modern libraries, traditional library science and modern library science. [Result/conclusion] The fundamental problem of modern library development is the service capability problem: from resource capability to service capability, from traditional service capability to new service capability, and building a new service capability system. In the new era, the disciplinary research paradigm of library science needs to shift all the time and space, promoting the continuous transformation of the library science discipline system from the disciplinary nature, research

object, development model, core capability, technical method, and disciplinary attribute.

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