

Research on the Coupling Mechanism of AI-Empowered Inter-library Mutual Assistance and Reading Therapy in Digital Intelligent Libraries from the Perspective of Educational Equity

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ABSTRACT

Educational equity is a cornerstone of social equity in modern society. As a new type of knowledge service infrastructure, digital intelligent libraries bear an important mission in promoting educational equity. At present, interlibrary mutual assistance has achieved notable results in resource co-construction and sharing, but deep collaboration at the service level still needs to be strengthened. Bibliotherapy has gradually developed in library service practices, yet it mostly remains at the stage of independent exploration by individual libraries, failing to fully leverage interlibrary collaborative networks for large-scale expansion. The rapid advancement of artificial intelligence (AI) provides a new technological impetus and implementation pathways to break through the above bottlenecks. Based on the theory of educational equity, this paper starts from the dual dimensions of "knowledge equity" and "developmental equity," thoroughly analyzes the internal logic and value implications of coupling interlibrary mutual assistance and bibliotherapy in digital intelligent libraries empowered by AI, and proposes an analytical framework for their coupling mechanism. The study constructs a coupling mechanism model encompassing four dimensions: resource layer, service layer, precision layer, and feedback layer. It elaborates the systematic pathway of "promoting collaboration through mutual assistance, promoting healing through collaboration, and promoting equity through healing" enabled by AI technologies. Furthermore, it proposes implementation strategies for the coupling mechanism from four aspects: institutional guarantee, talent guarantee, technical guarantee, and evaluation guarantee, aiming to provide theoretical reference and practical guidance for advancing library services from resource equity to psychological care and deepening the practical connotation of educational equity.

1. Introduction

Educational equity is a cornerstone of social equity and a fundamental prerequisite for the comprehensive development of individuals. In the knowledge economy era, the ability to access information and the level of mental health together constitute the core competencies for individual development^[1], and ensuring fairness in both has become a deeper proposition that educational equity must address in the new era. The Regulations on Promoting Nationwide Reading, promulgated by the State Council of China, officially came into effect on February 1, 2026, marking a milestone transition of the nationwide reading cause from "policy guidance" to "legal guarantee." This endows libraries with clearer institutional

responsibilities for promoting equitable access to knowledge. At the same time, the rapid development of digital intelligence technologies, especially the deep penetration of artificial intelligence (AI), is profoundly reshaping the service forms and capability boundaries of libraries. AI-driven technologies such as intelligent recommendation, natural language processing, affective computing, and knowledge graphs are accelerating the transformation of libraries from traditional document resource centers to smart and personalized knowledge service centers. In this transformation, the inclusiveness and accessibility of smart library services have been elevated to an unprecedented level, essentially representing a technological response and humanistic adherence to the principle of "knowledge equity." However, technological empowerment does not automatically translate into the realization of service equity. Currently, grassroots

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libraries still face significant shortcomings in physical facilities, digital resource updates, and service mechanisms, and resource allocation for reading-disadvantaged groups still lags behind actual social needs in terms of construction concepts, service methods, and operational mechanisms. How to narrow the service capability gap between libraries through interlibrary collaboration empowered by AI, and how to use intelligent bibliotherapy to meet readers' deep psychological needs and achieve the leap from "resource accessibility" to "psychological accessibility," have become key issues in libraries' practice of promoting educational equity.

Interlibrary mutual assistance and bibliotherapy are two important dimensions of library services. The former aims to bridge the service capability gap between libraries through resource sharing, while the latter focuses on promoting readers' mental health through reading. They are inherently consistent in the goal of promoting educational equity and complementary in their implementation paths. However, current research on the two remains largely separate, lacking systematic discussion on their synergistic and coupling mechanisms, and few studies have incorporated AI as a key enabling variable into the analytical framework. Therefore, from the perspective of educational equity, this paper explores the coupling mechanism of interlibrary mutual assistance and bibliotherapy in digital intelligent libraries empowered by AI, aiming to answer three core questions: Why and how does AI become a key driving force for their coupling? How can a theoretical framework for AI-empowered coupling be constructed? And how can the coupling mechanism be effectively implemented?

2. Theoretical basis and analytical framework

2.1. Multidimensional interpretation of educational equity theory

The connotation of educational equity has continuously enriched and deepened with social development. Classic theoretical frameworks provide essential foundations for understanding this evolution. John Rawls' theory of justice emphasizes that social institutions should guarantee the greatest benefit to the least advantaged members^[2], which directly supports the library's mission to serve disadvantaged reader groups. Coleman's report on educational opportunity shifted the focus from mere input equality to the equality of educational outcomes, highlighting the need to consider process and effect. Bourdieu's cultural capital theory further reveals that unequal distribution of cultural resources reproduces social inequality, which underscores the library's role in compensating for cultural capital deficits through open access and guided reading. Traditional educational equity mainly focuses on equal opportunities for enrollment and balanced resource allocation, falling within the category of "opportunity equity." With the evolution of educational concepts, the scope of educational equity has gradually expanded to form a complete spectrum including equity of starting point, equity of process, and equity of outcome. In the digital intelligence era, the connotation of educational equity further extends to deeper dimensions such as information

literacy, digital capability, and psychological development. Drawing upon these classic theories, this paper proposes a two-dimensional classification of "knowledge equity" and "developmental equity" to frame library services. Knowledge equity addresses the universal availability and accessibility of information resources—corresponding to Rawls' principle of fair equality of opportunity and Coleman's concern for input equality. Developmental equity focuses on the differentiated support for individual growth, mental health, and emotional well-being—resonating with Coleman's outcome equity and Bourdieu's emphasis on cultural empowerment. This dual dimension is not arbitrary but is theoretically grounded: it captures both the material and psychological aspects of educational equity, which are increasingly interdependent in the digital age. From the perspective of library services, educational equity is embodied in the universal guarantee of the right to knowledge acquisition and the adequate support for readers' development. On the one hand, libraries need to ensure that every reader can equally access knowledge resources, eliminating barriers caused by geography, economy, physical conditions, and other factors. On the other hand, libraries also need to pay attention to individual differences and developmental needs of readers during the reading process, providing appropriate services and support. The former points to "knowledge equity," and the latter points to "developmental equity," jointly constituting the dual dimensions of library practice in educational equity.

The inclusiveness and accessibility of smart library services precisely respond to this dual dimension: the core of accessibility lies in the spatial expansion of resource availability, while the essence of inclusiveness lies in the deep response to demand adaptability. Interlibrary mutual assistance and bibliotherapy respond to the requirements of educational equity from the levels of accessibility and inclusiveness respectively—interlibrary mutual assistance is committed to achieving universal guarantee of knowledge acquisition through resource co-construction and sharing, while bibliotherapy achieves adequate support for readers' development through psychological support and emotional care. Their coupling is precisely a practical exploration of libraries seeking unity between accessibility and inclusiveness and building a bridge between "knowledge equity" and "developmental equity." The intervention of AI provides an intelligent "pier" and "cable" for this bridge—accelerating the efficiency of resource scheduling and matching in interlibrary mutual assistance, and enhancing the precision of need identification and intervention in bibliotherapy.

2.2. Interlibrary mutual assistance in digital intelligent libraries

Interlibrary mutual assistance is a collaborative model established by libraries to compensate for the limitations of individual library resources and service capabilities. In the traditional library era, interlibrary mutual assistance mainly manifested as basic resource sharing such as document delivery and interlibrary loan. In the digital library stage, its scope expanded to areas such as database co-construction, digital resource sharing, and joint reference consultation. With the deepening of digital intelligence transformation, especially

the widespread application of AI, interlibrary mutual assistance is undergoing a paradigm shift from "resource sharing" to "service collaboration" and further to "intelligent collaboration."

Currently, interlibrary mutual assistance exhibits several important features. First, the continuous expansion of cooperation scale. The Guanzhong Plain Urban Agglomeration Public Library Alliance has covered 82 member libraries across Shaanxi, Shanxi, and Gansu provinces, forming a cross-provincial cultural collaboration community; the Fujian Academic Library Consortium has expanded to 92 institutions across the province, achieving mutual openness and joint support within the region. Second, the continuous strengthening of technical support. Cutting-edge technologies such as AI and blockchain are widely used in interlibrary collaboration platforms. For example, the "Yijing Jing'en" University Library Alliance explored innovative applications of blockchain technology and e-ink tablet reading in controlled digital lending; AI-driven cross-library intelligent scheduling systems are gradually replacing traditional manual coordination models. Third, the deepening of service collaboration. The Yangtze River Delta University Library Alliance has engaged in in-depth dialogues on core issues such as resource full-process management enabled by digital intelligence technologies, construction of new library service ecosystems, and co-construction and sharing of regional smart libraries, promoting regional libraries from loose cooperation to "integrated symbiosis." The role of AI in this process is increasingly prominent—from intelligent book selection, automatic cataloging, to semantic understanding in cross-library reference consultation, AI is upgrading interlibrary mutual assistance from a "human network" to a "human-machine collaborative network." The significance of interlibrary mutual assistance for educational equity is particularly prominent. Cross-school and cross-library resource sharing models greatly expand the coverage of resources, especially for institutions in central and western regions or those with relatively scarce resources. The sharing mechanism acts as a "knowledge transfusion," effectively narrowing the educational divide. The literature security working group of the "MOOC Westward Plan 2.0" has achieved positive results in educational resource sharing and literature security capacity improvement through paired cooperation between eastern and western university libraries, promoting the balanced development of educational resources. It can be said that interlibrary mutual assistance lays a resource-level foundation for libraries to promote educational equity, and AI makes this foundation more solid and agile.

2.3. Development of bibliotherapy in library services

Bibliotherapy refers to a service method that uses reading materials as a medium and guided reading activities to help readers resolve emotional distress and promote mental health. In the library field, bibliotherapy has undergone a development process from concept introduction to practical exploration, gradually becoming an important form of library reading promotion and psychological services. In recent years, China's library bibliotherapy practice has made considerable progress. In October 2025, the "Reading and Mental Health

Seminar" hosted by the Reading Promotion Committee of the Library Society of China was successfully held in Tangshan^[3], Hebei, bringing together experts and scholars from university libraries, public libraries, and mental health education fields across the country, fully demonstrating the fruitful achievements in theoretical research and practical exploration in the field of reading and mental health. The practical path of expanding university library reading promotion through "developmental bibliotherapy" has become increasingly clear. Targeting various common emotional distress issues faced by contemporary college students, experts select "book prescriptions" from Chinese and foreign books to strengthen emotional management and mental health construction for university students. In multi-disciplinary integrated "reading healing" activities, the practices of North China University of Science and Technology, Sichuan University, Zhejiang Chinese Medical University, and other university libraries have demonstrated exemplary significance, integrating different disciplinary characteristics and gaining recognition from faculty and students.

However, current library bibliotherapy services still face several constraints. In terms of resource allocation, each library independently builds its own healing book collection and spaces, lacking interlibrary collaboration, leading to redundant resource construction and limited service coverage. In terms of professional capacity, bibliotherapy requires the integration of multiple disciplines such as psychology, pedagogy, and library science, and most libraries lack professionally qualified bibliotherapy librarians. In terms of service coverage, bibliotherapy is mainly concentrated in university libraries, while public libraries, especially grassroots libraries, have relatively weak healing services, and the gap between urban and rural areas and between regions in mental health service resources cannot be ignored. In terms of technology application, although AI has emerged in other library services, its introduction into bibliotherapy is still in its infancy, lacking systematic intelligent healing assistants, sentiment analysis tools, and personalized recommendation engines. These issues indicate that relying solely on independent development of individual libraries cannot promote the widespread popularization and in-depth development of bibliotherapy services. There is an urgent need to introduce AI technology and rely on interlibrary collaborative networks to achieve breakthroughs.

2.4. Theoretical interpretation of coupling mechanism

"Coupling" originally comes from physics, referring to the phenomenon in which two or more systems interact and influence each other to become united. In social system research, coupling mechanisms are used to describe the process by which different subsystems achieve overall functional optimization through element interaction, functional complementarity, and structural synergy^[4]. Introducing the coupling mechanism into library service research aims to explore how the two relatively independent subsystems of interlibrary mutual assistance and bibliotherapy generate synergistic effects through interaction. The intervention of AI elevates this coupling from "static complementarity" to "dynamic intelligent coupling"—AI not

only serves as a tool to improve the operational efficiency of each subsystem, but also acts as an "intelligent intermediary" to establish real-time perception, adaptive scheduling, and closed-loop optimization channels between them.

From a systems theory perspective, library services are a complex system with multiple elements and layers. The interlibrary mutual assistance system focuses on resource-level connectivity and sharing, and its operational logic is the "scale effect"—achieving efficiency improvement by expanding resource coverage and reducing unit service costs. The bibliotherapy system focuses on depth and precision at the service level, and its operational logic is the "precision effect"—achieving healing effects through targeted reading interventions. Each has its strengths and limitations in promoting educational equity: interlibrary mutual assistance can solve the problem of "whether resources exist," but it is difficult to respond to individual readers' "suitability" needs; bibliotherapy can achieve "precise healing," but is limited by individual library resources and professional capacity, making large-scale coverage difficult.

The mechanism of their coupling lies in the realization of complementary effects, and AI enables this complementarity to be amplified exponentially. Interlibrary mutual assistance provides a channel for resource expansion for bibliotherapy—through interlibrary collaboration, the fragmented construction of bibliotherapy resources by individual libraries can be broken, achieving co-construction and sharing of healing bibliographies, interconnection of healing spaces, and cross-library mobility of professional personnel. AI-powered intelligent retrieval and semantic matching enable these dispersed healing resources to be quickly discovered and accurately invoked. Bibliotherapy, in turn, infuses interlibrary mutual assistance with deeper value—elevating it from the technical level of "borrowing interoperability" to the humanistic level of "spiritual mutual assistance." AI's affective computing and natural interaction capabilities enable cross-library psychological care services to break through physical distance, achieving remote intelligent companionship and real-time emotional response. The coupling of the two responds to both the requirement of resource accessibility and the concern for service appropriateness in educational equity, forming a complete service chain from "material supply" to "spiritual care," and AI serves as the "intelligent nerve" running through this chain.

3.Internal logic and value implications of the coupling mechanism

3.1.Resource complementarity: AI-driven aggregation

The coupling of interlibrary mutual assistance and bibliotherapy is first reflected at the resource level. The resource-sharing network established by interlibrary mutual assistance provides infrastructure for the cross-library flow of bibliotherapy resources. Currently, although libraries have their own characteristics in building bibliotherapy resources, insufficient interconnection leads to low resource utilization efficiency^[5]. For example, Library A has a rich collection of children's emotional management healing books, while

Library B has advantages in elderly psychological comfort books. However, due to the lack of an effective interlibrary sharing mechanism, readers can only access their own library's resources and cannot benefit from cross-library healing bibliography services. The deepening of interlibrary mutual assistance creates conditions for the co-construction and sharing of bibliotherapy resources. By establishing a joint catalog of healing resources, building a healing bibliography recommendation platform, and implementing cross-library healing document lending services, the scattered healing resources of each library can be aggregated into a healing resource network with broader coverage, more complete types, and better quality. In 2025, the Capital Library launched an intelligent mini-program "Reading Companion," providing 24/7 one-on-one reading companionship and warm healing, customizing exclusive bibliographies for readers through AI. This practice demonstrates that AI is making personalized and precise reading healing services possible, and if such services can be coordinated at the interlibrary level, greater social benefits will be generated. At the same time, the resource construction experience and management models accumulated by interlibrary mutual assistance can provide references for the specialized construction of bibliotherapy resources. Libraries' mature mechanisms in featured database construction, joint procurement, and resource evaluation can be transferred to the field of bibliotherapy resource construction, promoting the formation of standardized and normalized systems for co-construction and sharing of bibliotherapy resources. On this basis, AI technology can further realize intelligent tagging, semantic association, and cross-database integration of healing resources, transforming scattered healing documents from isolated islands into a knowledge network that can be intelligently retrieved and dynamically reorganized.

3.2.Service collaboration: networked linkage via AI

Service-level coupling is a key link in the deep integration of interlibrary mutual assistance and bibliotherapy. Currently, bibliotherapy services in various libraries are mostly in a state of "independent operation," with each library planning its own healing spaces, training its own healing librarians, and conducting its own healing activities, limiting service efficiency and coverage. The networked characteristics of interlibrary mutual assistance provide organizational foundation for the collaborative implementation of bibliotherapy services, and AI endows this collaboration with "intelligent scheduling" and "adaptive matching" capabilities.

Service collaboration can be reflected in multiple aspects. At the spatial level, a "healing space consortium" can be built through interlibrary alliances, enabling resource sharing and cross-library use of healing spaces. The practice of North China University of Science and Technology Library in building a "Reading Growth Education Base" demonstrates the construction logic of healing reading spaces under the guidance of spatial healing theory, and its interdisciplinary operating mechanism provides a replicable practical paradigm for healing space construction. AI-powered virtual healing spaces (such as VR meditation rooms and AI conversation corners) can be accessed through shared portals across

libraries, allowing readers to obtain consistent immersive healing experiences regardless of which library they are in. At the activity level, interlibrary alliances can jointly plan and organize themed reading healing activities, such as cross-library "reading marathons," multi-library linked healing reading clubs, and expert lecture tours, expanding service coverage and influence. AI can assist in intelligent scheduling of activities, matching participant interests, and generating content, improving the efficiency and relevance of activity organization. At the personnel level, mechanisms for cross-library training, exchange, and collaboration of professional healing librarians can be established to improve overall professional competence through "librarian co-education." AI-assisted training platforms (such as intelligent Q&A and case simulations) can reduce the time and space costs of cross-library training, enabling efficient replication of quality training resources. More importantly, digital intelligence technologies provide unprecedented possibilities for service collaboration. Relying on cloud platforms and AI technologies, a cross-library reading healing service system can be built to realize cross-library identification of reader healing needs, cross-library allocation of healing resources, and cross-library tracking of healing processes. Practices such as Suzhou Library's AI assistant, Hangzhou Digital Intelligence Technology Library's virtual digital human, and Yancheng Library's AI intelligent companion demonstrate the broad application prospects of AI in library services. Extending these technologies to the interlibrary collaboration of reading healing services will turn "cross-library healing" from an ideal into reality.

3.3. Precise adaptation: AI-enabled personalization

The realization of educational equity requires not only universal coverage of resources but also precise adaptation of services. Different reader groups have significantly different reading healing needs: children need emotional cognition healing books, adolescents need "book prescriptions" to cope with growth anxiety, the elderly need reading companionship to soothe loneliness, and special groups need accessible healing experiences. The coupling of interlibrary mutual assistance and bibliotherapy provides both resource and technical support for achieving this precise adaptation, and AI is the core engine for achieving "precision."

At the resource level, interlibrary mutual assistance expands the variety and quantity of healing resources, providing a richer material foundation for personalized bibliography customization. Relying on the interlibrary network, a healing resource database covering all age groups and multiple fields can be built to accurately recommend the most suitable healing materials based on reader profiles. Under the framework of developmental bibliotherapy, for various common emotional distress issues faced by contemporary college students, libraries can select "book prescriptions" from the interlibrary-shared healing resource database, achieving the transformation from "general recommendation" to "precise prescription." AI large language models can understand readers' natural language expressions, extract emotional themes, difficulty levels, and cultural

adaptability from vast healing literature, and generate truly personalized reading prescriptions.

At the technical level, AI provides powerful technical support for precise adaptation. Through big data analysis of readers' reading behavior and mental health needs, user profiles can be constructed, and AI can intelligently match healing resources with reader needs, enabling the generation and dynamic adjustment of personalized healing bibliographies. Li Qiang proposed that public library reading healing services based on generative AI can design service paths around three dimensions: constructing user profiles, strengthening resource support, and promoting psychological interaction, fully extracting user demand tags, customizing reading healing service plans, and personalizing healing book prescriptions^[6]. The interlibrary mutual assistance network can amplify this technical advantage, extending precise adaptation from single-library coverage to full-region coverage. Furthermore, AI affective computing technology can analyze readers' emotional feedback during the reading process in real time (such as reading duration, pause positions, facial expressions, etc.), dynamically adjusting subsequent recommendation strategies to form an intelligent closed loop of "perception - recommendation - feedback - re - recommendation."

3.4. Deepening equity: from resource to psychological care

The ultimate direction of coupling interlibrary mutual assistance and bibliotherapy is the deepening and expansion of the connotation of educational equity. Traditional views of educational equity focus on the balance of resource distribution, equating equity with "everyone having books to read." However, under modern educational concepts, equity should also include the two higher-level goals of "everyone reading good books" and "everyone reading joyfully." The former focuses on equity in reading quality, and the latter focuses on equity in reading experience and reading outcomes.

The introduction of bibliotherapy extends the boundary of educational equity from the material resource level to the psychological care level. Bibliotherapy is concerned not only with "how many books readers read," but also with "what feelings they gain" and "what problems they solve." It transforms the library from a knowledge warehouse into a spiritual way station, turning cold information provision into warm emotional companionship. The Capital Library's upcoming "Reading Companion" intelligent mini-program, which provides 24/7 one-on-one reading companionship and warm healing, is a vivid manifestation of libraries' transformation toward psychological care. The addition of AI enables this psychological care to be "ubiquitous and always available"—intelligent chatbots can listen to readers' emotional confessions at any time, and virtual healing assistants can provide preliminary psychological guidance, without interruption due to librarian schedules or holidays.

Interlibrary mutual assistance provides organizational guarantees for the equitable realization of psychological care. Through interlibrary collaboration, professional healing services from libraries in developed regions can be extended to grassroots and underdeveloped areas, allowing quality psychological care resources to benefit a wider range of reader

groups. AI plays the role of a "service multiplier" in this process—an AI healing engine deployed at a central library can simultaneously provide intelligent book recommendation and sentiment analysis services for dozens of grassroots libraries, greatly reducing the technical threshold and professional costs for grassroots libraries to carry out bibliotherapy. In October 2025, Jiangxi Provincial Library, in conjunction with Jiujiang Disabled Persons' Federation and Jiujiang Special Education School, launched the "Sound of Joy" digital reading promotion activity, using digital means to create a warm and creative immersive reading experience for local special children. This project was awarded the title of "2023-2024 National Reading Outstanding Project" by the General Office of the Publicity Department of the CPC Central Committee. Such practices show that when interlibrary mutual assistance networks are combined with AI-driven bibliotherapy services, the practice of educational equity transcends the level of "resource arrival" and enters the higher realm of "spiritual arrival."

4.Construction of the coupling mechanism

4.1.Overall architecture of the coupling mechanism

Based on the above analysis, this paper proposes an overall architecture for the coupling mechanism of interlibrary mutual assistance and bibliotherapy in digital intelligent libraries empowered by AI. This architecture takes educational equity as the value orientation, AI technology as the core supporting tool, the interlibrary mutual assistance network as the

organizational carrier, and bibliotherapy services as the practical content, constructing a four-dimensional integrated coupling system of "resource—service—precision—feedback." Unlike traditional coupling frameworks, this architecture regards AI as a "horizontal enabling axis" running through all layers—not only playing an efficiency-enhancing role within each layer, but also serving as the intelligent dispatching hub for data flow, decision flow, and feedback flow between layers.

In the overall architecture, the interlibrary mutual assistance system undertakes the function of "horizontal connectivity," and the bibliotherapy system undertakes the function of "vertical deepening." The interlibrary mutual assistance system establishes a horizontal collaborative network among libraries through resource co-construction, service collaboration, standard unification, and data interoperability. On the basis of this network, the bibliotherapy system achieves vertical in-depth services for readers' mental health through healing resource construction, healing space creation, healing activity organization, and healing effect evaluation. The coupling of the two is realized through AI technology as a "smart catalyst"—AI not only empowers the efficiency of interlibrary mutual assistance (such as intelligent resource scheduling and cross-library semantic retrieval), but also empowers the precise implementation of bibliotherapy (such as sentiment analysis and personalized recommendation), and gives rise to new service forms at their intersection (such as cross-library AI healing companions and intelligent healing effect tracking). The following sections describe the specific construction of the four coupling layers.

Table 1. Four-dimensional architecture of the AI-empowered coupling mechanism between interlibrary mutual assistance and bibliotherapy

Dimension	Core Functions	AI Empowerment Focus	Value for Educational Equity
Resource Layer	Joint bibliography development, collaborative construction of featured resources, dynamic updating and elimination	Intelligent indexing and semantic fusion, logical cross- database integration, automatic elimination analysis	Knowledge accessibility (equity of starting point)
Service Layer	Interconnection of healing spaces, joint organization of activities, unification of service standards	Intelligent scheduling and virtual healing spaces, intelligent activity recommendation, standardization + flexible adaptation	Service equity (equity of process)
Precision Layer	Reader profile construction, intelligent recommendation engine, personalized plan customization	Large language models and affective computing, knowledge graph matching, real-time dynamic adjustment	Developmental equity (equity of outcome)
Feedback Layer	Individual effect tracking, system performance evaluation, mechanism iterative optimization	Automatic sentiment analysis and visual dashboard, adaptive predictive optimization	Continuous improvement (dynamic equity)

4.2. Resource coupling layer

The resource coupling layer is the foundational level for the coupling of interlibrary mutual assistance and bibliotherapy. The core task of this layer is to build a widely covered, reasonably configured, and timely updated healing resource network through interlibrary collaboration and AI empowerment. Specifically, resource coupling includes the following key links.

First, joint construction of healing bibliographies. Led by interlibrary alliances, experts from multiple disciplines such as psychology, pedagogy, and library science are organized to jointly formulate selection standards and classification systems for reading healing bibliographies, and to establish a joint healing bibliography database. The database covers healing themes such as emotion management, stress adjustment, interpersonal communication, self-cognition, and life education, and is classified according to dimensions such as reader age, reading ability, and psychological state. Member libraries procure and construct healing resources according to the joint bibliography, avoiding duplicate investment and resource gaps. On this basis, AI-assisted automatic indexing and topic clustering technologies can perform multi-dimensional fine-grained annotation of healing bibliographies (such as emotional intensity, healing style, cultural background, etc.), laying a data foundation for subsequent precise recommendations.

Second, co-construction of featured healing resources. Each library is encouraged to leverage its own advantages to

build featured healing resources, such as themed healing collections, special shelves for specific groups, and healing resources in various forms (e.g., audio books, picture books, audio-visual materials), and to share them with other member libraries through the interlibrary mutual assistance network. The "Cloud Library" of Shanghai Pudong integrates specialized databases and inclusive services from multiple social libraries and university libraries to build a reading resource matrix covering all educational stages and disciplines. This model provides a useful reference for the featured co-construction of healing resources. AI technology can achieve logical integration of different libraries' featured resources through cross-database semantic fusion, allowing readers to perceive no physical ownership of resources under a unified search interface, realizing "transparent cross-library access."

Third, dynamic updating and elimination mechanisms for healing resources. A regular evaluation system for healing resources should be established, with dynamic adjustments based on indicators such as resource usage frequency, reader feedback, and healing effects, ensuring the timeliness and effectiveness of the resource pool. AI can automatically capture readers' borrowing records, reading comments, and psychological assessment data, generate resource popularity and utility reports, and assist in deciding which resources need to be added, replaced, or removed, keeping the resource pool "active."

The above three key links and their AI empowerment roles are summarised in Table 2.

Table 2. Key links and AI empowerment in the resource coupling layer

Key Link	Specific Content	AI Empowerment Role
Joint bibliography construction	Unified selection standards, classification system, joint database covering multiple healing themes	Automatic indexing, topic clustering, fine-grained semantic annotation for precise matching
Co-construction of featured resources	Each library develops specialised collections and shares them via the interlibrary network	Cross-database semantic fusion, transparent unified search, logical integration
Dynamic updating and elimination	Regular evaluation based on usage, feedback, and healing effects	Automated capture of usage data, popularity/utility analysis, proactive elimination suggestions

4.3. Service coupling layer

The service coupling layer is an extension and deepening of resource coupling. Its core is to integrate the scattered bibliotherapy services of various libraries into a synergistically linked service network, achieving a "1+1>2" synergy effect. The role of AI in this layer is particularly prominent, as it makes collaboration not simply "joint activities" but deep "intelligent integration." The practical paths of service coupling mainly include three aspects.

First, interconnection of healing spaces. When building healing reading spaces, libraries can adopt unified service standards and management norms, enabling readers to enjoy

continuous and consistent healing service experiences across different libraries. For example, a cross-library healing space reservation system can be established, allowing readers to book healing spaces at any member library; a cross-library healing borrowing card can be implemented, enabling readers to return healing materials borrowed from any member library to other member libraries. AI-powered virtual healing spaces (such as online healing reading rooms and AI-guided meditation rooms) can break physical space limitations, allowing readers to access the alliance's healing services even at home, which is of particular equity significance for readers with limited mobility or in remote areas.

Second, joint organization of healing activities. Interlibrary alliances can plan and organize series of reading healing

activities, such as joint healing reading clubs, cross-library healing workshops, themed healing exhibitions, and psychological expert lecture tours. The 2025 "Reading and Mental Health Seminar" featured the sharing of nine innovative practice cases from across the country, enriching the activity models and materials for joint healing activities. These models and materials can be shared and reused at the interlibrary level, reducing the costs of independent activity planning for each library and enhancing the professionalism and influence of activities. AI can assist in intelligent activity planning—by analyzing the interest profiles of reader groups in various libraries, automatically generating activity theme suggestions, recommending suitable expert speakers, and even generating promotional copy and discussion outlines.

Third, standardization and normalization of healing services. Formulate service standards for bibliotherapy, including healing service processes, qualification requirements for healing librarians, and healing effect evaluation methods, to promote the standardization and professionalization of healing services across libraries. Through unified standards, readers can expect comparable quality of healing services at different libraries, thereby ensuring educational equity at the service level. AI can provide "flexible adaptation" on top of standardization—automatically fine-tuning service pace and content based on real-time reader feedback, achieving a dynamic balance between standardization and personalization.

4.4. Precision coupling layer

The precision coupling layer is the core feature of the coupling of interlibrary mutual assistance and bibliotherapy in the digital intelligence era, and it is also the level where AI technology exerts its greatest effectiveness. Its essence is to leverage artificial intelligence, big data, and other digital intelligence technologies to achieve precise matching of healing resources and reader needs, transforming bibliotherapy services from "one-size-fits-all" to "one-size-fits-one."

The realization of precision coupling depends on three key elements, each with AI as the technical foundation. First, big data-driven construction of reader profiles. By integrating reader reading behavior data, healing service usage data, and mental health assessment data from the interlibrary network, a cross-library reader digital profiling system is established. This system can identify readers' reading preferences, emotional characteristics, and psychological needs, providing a data basis for personalized healing recommendations. AI sentiment analysis models can extract implicit psychological needs from readers' search terms, borrowing histories, and even book review texts, compensating for the lag and subjectivity of traditional questionnaire assessments. In 2026, the library industry is promoting a series of trainings on "Data Intelligence-Driven Management and Service Innovation," focusing on enhancing librarians' data literacy and intelligent application capabilities, providing talent support for the construction of reader profiling systems.

Second, AI-driven intelligent recommendation engine. Based on large language models and knowledge graph technologies, an intelligent reading healing recommendation

system is constructed. The system screens, matches, and recommends the most suitable healing materials and activities from the interlibrary-shared healing resource database according to reader profiles. Unlike general book recommendations, healing recommendations need to comprehensively consider the emotional tone, difficulty level, cultural context, and compatibility with the reader's current psychological state—exactly where large language models excel in semantic understanding and affective computing. Suzhou Library's "Suzhou Book Warehouse" has launched application modules such as "AI Assistant," "AI Book Recommendation," and "Book Mind Exploration," providing intelligent consultation, book finding, recommendation, borrowing, and activity services. Such AI applications can be extended to the field of reading healing, enabling intelligent healing services.

Third, personalized healing plan customization. For readers with special healing needs, the system can generate personalized healing reading plans, including healing bibliographies, reading schedules, supporting activities, and progress tracking. Generative AI-based reading healing services can create a long-term interactive closed loop with users, guiding them to shape a healthy mentality. Such deeply personalized services can only be truly realized on the basis of full interlibrary resource sharing—without the interlibrary mutual assistance healing resource pool, personalized recommendations would lack sufficient material selection space; and without AI intelligent matching, even massive resources would not enable "instant" precise screening.

4.5. Feedback coupling layer

The feedback coupling layer is an indispensable closed-loop link in the coupling mechanism. Its function is to ensure continuous improvement in the effectiveness of the coupling between interlibrary mutual assistance and bibliotherapy through ongoing effect evaluation and mechanism optimization. The operational mechanism of feedback coupling includes three levels, with AI playing the key role of "automatic collection - intelligent analysis - adaptive optimization" at each level.

At the individual level, establish a tracking and evaluation system for readers' healing effects. Through regular assessments, reading feedback, and behavioral analysis, monitor the impact of healing services on readers' mental health, and adjust healing plans and resource recommendations accordingly. AI can use natural language processing to analyze readers' reading diaries or social media expressions, capturing emotional change trajectories; it can also use computer vision to analyze readers' facial micro-expressions in healing spaces, assisting in judging the healing process. With privacy protection as a premise, these data form individualized "healing effect curves," providing scientific evidence for subsequent interventions.

At the system level, establish an effect evaluation index system for interlibrary collaborative services, evaluating the overall effectiveness of the coupling mechanism from dimensions such as resource utilization rate, service coverage, reader satisfaction, and healing effectiveness. AI can automatically aggregate operational data from various

libraries, generate a visual alliance performance dashboard, promptly identify service blind spots and resource redundancies, and assist managers in making regulatory decisions.

At the policy level, based on evaluation results, form decision-making recommendations for mechanism optimization, promoting continuous iteration and improvement of the coupling mechanism. AI's machine learning capabilities enable the system to automatically induce patterns of "which strategies are effective and which are ineffective" from historical evaluation data, and proactively push optimization suggestions to decision-makers. Research on the integration model of bibliotherapy and university mental health education points out that dynamic tracking evaluation is an important path to achieving integration^[7]. This principle also applies to the coupling of interlibrary mutual assistance and bibliotherapy—only with a well-established, AI-enhanced feedback mechanism can the coupled system maintain vitality and effectiveness.

5. Guarantee strategies for the coupling mechanism

5.1. Institutional guarantee

The effective operation of the coupling mechanism cannot be separated from a sound institutional guarantee. At the policy level, the coordinated development of interlibrary mutual assistance and bibliotherapy services should be incorporated into the policy framework for nationwide reading promotion and public cultural services, and the compliance boundaries and ethical requirements for AI technology application should be clearly defined. The promulgation and implementation of the Regulations on Promoting Nationwide Reading provide a legal guarantee for library reading promotion, but the regulations focus on the overall advancement of reading promotion and lack specific guidance for the interlibrary collaboration of specialized services such as bibliotherapy and the specific ways of AI empowerment. It is suggested that in the implementation rules or supporting documents of the regulations, the responsibilities, resource guarantees, interlibrary collaboration requirements, and privacy protection and algorithm transparency standards for AI-assisted services in libraries' bibliotherapy services be clearly stipulated.

At the standard level, industry standard systems for bibliotherapy services need to be established, including standards for healing bibliography classification, healing space construction, healing librarian qualifications, healing service processes, healing effect evaluation, as well as interpretability standards for AI recommendation systems and data storage and desensitization specifications for reader psychological data. Standard unification is a prerequisite for interlibrary collaboration. Only when libraries follow the same service norms and AI application guidelines can seamless service interconnection and quality equity be achieved. The standard construction experience of large co-construction and sharing projects such as CADAL can provide references for the standardization of bibliotherapy services.

At the organizational level, specialized organizations for bibliotherapy interlibrary collaboration should be promoted, such as adding a bibliotherapy working committee or professional committee under existing library alliances, to coordinate member libraries' cooperation in healing resource construction, service implementation, talent cultivation, and AI platform co-construction. The 2025 "Reading and Mental Health Seminar" saw the Reading and Mental Health Professional Group of the Reading Promotion Committee of the Library Society of China play an important organizational and leading role. This professional organization model can be further extended toward interlibrary collaboration and AI governance.

5.2. Talent guarantee

Bibliotherapy is an interdisciplinary professional field that requires the integration of knowledge from library science, psychology, pedagogy, medicine, and other disciplines. In the new situation of AI empowerment, it also requires basic literacy in data science and artificial intelligence. Currently, China's library bibliotherapy professionals are severely lacking, and compound talents who understand both healing and AI are even rarer, becoming a major bottleneck restricting service development. Therefore, talent cultivation is a key guarantee for the realization of the coupling mechanism.

In terms of cultivation paths, a model of "hierarchical cultivation, cross-library collaboration, and AI empowerment" can be adopted. First, relying on university library science and psychology programs, offer courses in bibliotherapy orientation, and add modules such as "AI in Reading Healing" and "Data-Driven Reader Psychological Analysis" to cultivate compound professionals with basic bibliotherapy theories and AI practical capabilities. Second, provide special training for in-service librarians on bibliotherapy, systematically integrating training on AI tool usage (such as operation of intelligent recommendation systems, interpretation of sentiment analysis results, and data privacy protection practices), to enhance their ability to carry out intelligent healing services. The 2026 library series training on "Data Intelligence-Driven Management and Service Innovation" provides a platform for librarian capacity enhancement, and the integrated training of bibliotherapy and AI should be included. Third, establish cross-library talent exchange mechanisms. Professional healing librarians from libraries in developed regions can support the construction of bibliotherapy services in underdeveloped regions through regular assignments and remote guidance, and AI-assisted remote collaboration platforms (such as intelligent meetings and shared case libraries) can greatly reduce exchange costs. Wang Jingwen et al. proposed that priority should be given to cultivating full-time librarians with backgrounds in psychology, pedagogy, and reading culture to manage healing document collections and provide reader services in healing reading spaces. This talent cultivation concept should be promoted at the interlibrary level and simultaneously strengthened with AI literacy cultivation.

5.3. Technical guarantee

Digital intelligence technologies, especially AI, are the core support for the coupling of interlibrary mutual assistance and bibliotherapy. Building a unified digital intelligence service platform is the technical foundation for achieving deep coupling. The platform should have the following core functional modules: first, a resource management module, realizing unified cataloging, joint retrieval, and cross-library lending of healing resources from member libraries, and integrating AI automatic indexing and semantic association functions; second, a service management module, enabling online release, appointment management, and effect tracking of healing activities, and embedding AI activity recommendation and intelligent customer service; third, a reader management module, realizing cross-library unified management of reader profiles and personalized recommendation of healing services, driven by AI for real-time updates of user profiles and dynamic adjustment of healing plans; fourth, a data analysis module, enabling summary analysis of service data and decision support, using machine learning models to predict service trends and discover potential needs. The "Cloud Library" platform of Shanghai Pudong combines the two core functions of "educational resource complex" and "digital reading ecosystem," integrating specialized databases and inclusive services from multiple social libraries and university libraries to build a reading resource matrix covering all educational stages and disciplines. Its platform architecture provides a reference for the construction of reading healing service platforms.

In terms of technical implementation, the construction of an "AI middleware" should be emphasized—including large language model interfaces, affective computing engines, knowledge graph management, and federated learning frameworks, so that even member libraries without local AI capabilities can obtain consistent intelligent services through cloud-based calls. At the same time, platform construction should pay attention to security and privacy protection. Healing services involve sensitive information such as readers' mental health, and strict data security management systems must be established, using technical means such as differential privacy and homomorphic encryption to ensure the security of reader data in cross-library circulation.

5.4. Evaluation guarantee

Evaluation is an important part of promoting continuous improvement of the coupling mechanism. A scientific evaluation index system should be established to regularly assess the operational effectiveness of the coupling mechanism of interlibrary mutual assistance and bibliotherapy. The design of evaluation indicators should cover multiple dimensions such as input, process, output, and effect. Input indicators include investment in healing resource construction, talent cultivation, and technical platforms; process indicators include frequency of interlibrary collaborative activities, coverage of healing services, and resource utilization rate; output indicators include number of healing bibliographies, number of healing activities, and number of participating

readers; effect indicators include improvement in readers' mental health, reader satisfaction, and effectiveness in promoting educational equity. In effect evaluation, the assessment framework of developmental bibliotherapy can be introduced, focusing on positive changes in readers' emotion management, self-cognition, and social adaptation.

On this basis, introduce AI-assisted assessment tools—using natural language processing to analyze emotional tendencies in readers' open-ended feedback, using machine learning models to quantify individual differences in healing effects, and using automated data collection to generate real-time evaluation reports, reducing the subjectivity and lag of manual evaluation. The feedback and application of evaluation results are the ultimate purpose of evaluation guarantee. Based on the assessment results, problems and deficiencies in the operation of the coupling mechanism should be promptly identified, and targeted optimization suggestions should be proposed, forming a virtuous cycle of "evaluation—feedback—optimization." AI's predictive analysis capabilities can also help anticipate potential risks, enabling "proactive optimization." At the same time, a cross-library sharing mechanism for evaluation information should be established, enabling member libraries to learn from each other's experiences, complement each other's strengths, and jointly improve service levels and equity assurance capabilities.

6. Conclusion

Educational equity is an important yardstick of social progress, and libraries, as an integral part of the public knowledge service system, bear an irreplaceable mission in promoting educational equity. From the perspective of educational equity, this paper systematically explores the coupling mechanism of interlibrary mutual assistance and bibliotherapy in digital intelligent libraries empowered by AI, revealing the internal connections and value implications of the two at four levels: resource complementarity, service collaboration, precise adaptation, and deepening equity. It constructs a four-dimensional coupling mechanism framework of "resource—service—precision—feedback" and proposes guarantee strategies from four dimensions: institutional, talent, technical, and evaluation. AI in this framework is not a mere technical addition, but acts as an "intelligent connector" running through every layer and link of the coupling—making resource aggregation smarter, service collaboration smoother, precise adaptation more intimate, and effect feedback more scientific.

The coupling of interlibrary mutual assistance and bibliotherapy is essentially a positive response of libraries to the proposition of educational equity in the digital intelligence era. Interlibrary mutual assistance solves the problem of "broad coverage" of knowledge acquisition, while bibliotherapy responds to the need for "deep care" for readers' psychology. Their coupling enables library services to achieve an upgrade from "material equity" to "spiritual equity," and AI empowers this upgrade with the characteristics of "intelligitization," "ubiquitousness," and "sustainability." In the context of the formal implementation of the Regulations

on Promoting Nationwide Reading and the new stage of legalization of the nationwide reading cause, promoting the deep coupling of interlibrary mutual assistance and bibliotherapy empowered by AI not only has theoretical innovation significance but also has urgent practical value^[8].

Of course, this study still has several limitations. The empirical testing of the coupling mechanism needs further deepening; the differentiated positioning of different types of libraries (university libraries, public libraries, grassroots libraries) in the AI-empowered coupling mechanism needs refinement; the impact of reader group heterogeneity on the fairness of AI recommendations also requires more in-depth discussion; and the ethical issues that may arise in AI applications, such as algorithmic bias and the digital divide, need further analysis. Research on these issues will provide richer theoretical resources and operational guidance for libraries' practice of promoting educational equity. It is hoped that more research will pay attention to this field in the future, jointly promoting the profound transformation of library services from "knowledge waystations" to "spiritual waystations," and letting AI become the light that illuminates every reader's heart.

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