Optimization of Library Knowledge Services under the Background of Interdisciplinary and Transdisciplinary Integration

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Abstract

The commonality between interdisciplinary and transdisciplinary fields is the integration of knowledge and methods from different disciplines to solve complex practical problems. As a storage and dissemination center for knowledge resources, libraries have abundant multidisciplinary resources that can provide support for interdisciplinary and transdisciplinary development, and will also play an important role in the new knowledge environment. At the same time, libraries also face some challenges, such as the issues of disciplinary boundaries and information integration, the diversity and complexity of interdisciplinary and transdisciplinary research needs, and how library technology and resources can be better updated and adjusted to adapt to their own sustainable development. Libraries should address these challenges, achieve deep level changes in knowledge organization and discovery, build new knowledge service systems, and apply them to the construction of future learning centers.

Keywords: interdisciplinary; transdisciplinary; knowledge services; knowledge organization; knowledge discovery

Introduction

The progress of technology and the rapid growth of knowledge have led us into an era of "big science" [1], and scientific research has already shown highly comprehensive characteristics. The rapid application of emerging artificial intelligence tools such as Chat GPT, as well as the widespread dissemination of human-computer interaction and intelligent creation achievements, not only heralds the formation of a digital age full of changes, but also achieves the "fourth scientific research paradigm" [2] based on data-intensive computing. The Ministry of Education of China's "Excellent Engineer Education and Training Plan" [3], "New Humanities Construction" [4] and other policies have made "interdisciplinary" the theme of talent cultivation. Concepts such as "digital humanities" and "integration of art and science" have become a catalyst for transcending disciplinary barriers... These events collectively reflect the reality that the academic community is facing a broader information, cultural, and technological environment, with diverse and complex knowledge, interdisciplinary integration, and interdisciplinary and transdisciplinary integration development becoming an important

trend. As an important place for knowledge dissemination and academic research, libraries will inevitably be endowed with new values and functions by this series of changes in the knowledge ecosystem [5].

The Knowledge Environment of Interdisciplinary and Transdisciplinary Integration Development

Interdisciplinary and transdisciplinary are two important concepts in the current field of knowledge, representing the trend of knowledge integration and expansion. With the development of science and technology and changes in social demands, interdisciplinary and transdisciplinary research has received widespread attention and application in academia and practice, providing opportunities and challenges for academic research and knowledge innovation.

Interdisciplinary refers to a method or concept in academic research or education that is not limited to a single discipline, but involves comprehensive research or teaching across multiple disciplinary fields [6]. The concept of interdisciplinary emphasizes two points: 1) Comprehensiveness. Interdisciplinary not only focuses on the knowledge and methods of a particular discipline, but also integrates the theories, methods, and perspectives of multiple disciplines to obtain a more comprehensive and in-depth understanding; 2) Crossover. Interdisciplinary research or teaching involves the intersection of multiple disciplines, generating new insights and innovations through interaction and cooperation between different disciplines. In short, interdisciplinary studies reflect an interdisciplinary academic research or teaching method that helps people broaden their horizons and promote mutual cooperation between disciplines.

Transdisciplinary refers to the integration of knowledge and methods from multiple disciplines beyond the boundaries of traditional disciplines, in order to solve complex problems or explore new fields of knowledge. It is not just about simply combining knowledge and methods from different disciplines, but also forming a new disciplinary category through in-depth research and integration [7]. Transdisciplinary emphasis: 1) Crossing disciplinary boundaries. Transdisciplinary are not limited by traditional disciplines and can cover multiple disciplinary fields, such as natural sciences, social sciences, humanities, etc; 2) Integration. The transdisciplinary integration of knowledge and methods from multiple disciplines forms a comprehensive disciplinary system that can comprehensively consider multiple factors and perspectives; 3) Innovation and foresight. Transdisciplinary typically involve research in emerging fields or complex problems, requiring innovative thinking and methods, and possessing strong foresight. In short, the emergence of transdisciplinary studies is more about providing avenues for solving complex problems and exploring new fields.

Both interdisciplinary and transdisciplinary concepts involve multiple disciplinary fields, and they share certain similarities and differences in their definitions and characteristics. Firstly, both interdisciplinary and transdisciplinary approaches are designed to address issues beyond a single domain of knowledge, emphasizing the intersection and integration of disciplines and focusing on the overall picture of the entire system or domain. Secondly, they advocate for providing more comprehensive solutions by integrating knowledge and methods from different disciplines. Combining the thinking and methods of different disciplines can generate new insights, thus both interdisciplinary and transdisciplinary have a certain degree of innovation and creativity.

Interdisciplinary and transdisciplinary also have some significant differences. By definition, interdisciplinary emphasizes the intersection and integration between disciplines, while transdisciplinary emphasizes the integration and transcendence of disciplinary categories, forming a broader knowledge system. Therefore, although both interdisciplinary and transdisciplinary approaches involve interdisciplinary intersection, transdisciplinary approaches typically involve a wider range of fields, including the integration of multiple disciplines and the creation of new disciplinary categories. Therefore, some scholars believe that transdisciplinary studies seek better disciplinary cooperation on the basis of interdisciplinary studies [8], or even propose that the goal of interdisciplinary studies is to build transdisciplinary studies [9]. Admittedly, compared to interdisciplinary studies, transdisciplinary studies have a deeper degree of interdisciplinary nature, but in reality, the two represent the "horizontal" and "vertical" dimensions of interdisciplinary integration. Especially in the pursuit of comprehensiveness and completeness, the focus of the two is different. The goal of interdisciplinary studies is to integrate knowledge and methods from different disciplines, solve specific problems, while the goal of transdisciplinary studies is to further expand beyond the scope of traditional disciplines and create new disciplinary fields or research paradigms. Therefore,

in terms of methodology, interdisciplinary emphasizes the combination of knowledge and methods from different disciplines, while transdisciplinary thinking requires a more beyond disciplinary boundaries. In summary, the core similarities and differences between interdisciplinary and transdisciplinary are shown in Table 1.

	Interdisciplinary	*Transdisciplinary*
Definition	Integrating the knowledge and methods of two or more disciplines to address research questions or solve problems	Transcending traditional disciplinary boundaries, synthesizing the knowledge and methods of multiple disciplines to form new academic fields
Examples	Biochemistry, Neuroscience, Environmental science, etc.	Artificial Intelligence, Digital Humanities, Complex systems, etc.
Objectives	Facilitating communication and collaboration between disciplines	Creating new academic fields and knowledge systems, solving complex problems
Scope	Crossing between existing disciplines, emphasizing the complementarity and integration among disciplines	Transcending the scope of existing disciplines to form new academic fields
Methods	Drawing on theories, methods, and technologies from other disciplines for comprehensive research and innovation	Integrating theories, methods, and techniques from multiple disciplines to create new research paradigms
Value	Promoting the development of disciplines and driving scientific progress	Solving complex problems, creating new knowledge systems
Challenges	Challenges in communication and collaboration between disciplines	Blurred disciplinary boundaries and challenges in definition

Table 1: Comparison between Interdisciplinary and Transdisciplinary.

The integration of interdisciplinary and transdisciplinary development is a necessary and inevitable choice to adapt to complex problem-solving, broaden disciplinary boundaries, meet the needs of comprehensive talents, and promote innovation and progress. With the rapid development of technology and the increasing complexity of social problems, research in a single discipline can no longer fully solve complex problems in the real world, and many real-world problems are no longer limited to the scope of a single discipline. Interdisciplinary and transdisciplinary are knowledge clusters that are aggregated in specific application contexts. Interdisciplinary emphasizes the cross integration of different disciplines, while transdisciplinary emphasizes task oriented, comprehensive research from multiple disciplinary fields beyond traditional disciplines. The integration of interdisciplinary and transdisciplinary approaches is not only an inevitable trend in disciplinary development, but also a necessary means to promote social progress and solve major problems in order to address complex challenges and solve comprehensive problems.

The integration of interdisciplinary and transdisciplinary development will have a profound impact on the knowledge environment, broaden research fields, bring new ways of thinking and research methods, and promote the process of scientific research and social development. The demand for talent in the real world has also changed, and people with interdisciplinary backgrounds and interdisciplinary comprehensive abilities will better adapt to the development of society.

The Development and Current Situation of Library Knowledge Services

The knowledge service of a library refers to various forms of knowledge acquisition, transmission, and management services provided by the library to users [10]. As an important carrier of knowledge resources and provider of knowledge services, libraries have undergone a series of transformations, from traditional paper books to digital resources, from paper media to electronic media, from borrowing services and disciplinary services to diversified knowledge services, and from physical space to virtual space. These transformations reflect the ability of libraries to adapt to the changing times and also reflect their attention and response to user needs.

Traditional libraries focus on book collection and provide reading and borrowing services, but these services cannot yet be called "knowledge services". With the progress of society and the development of modern libraries themselves, focusing solely on book collection and providing borrowing is no longer sufficient to meet the needs of users. Therefore, libraries have begun to transform from book centric to knowledge centric [11], actively exploring the field of knowledge services. In 1999, Ren Junwei first introduced the concept of "knowledge service" to the Chinese library and information field in his article "Knowledge Economy and Knowledge Services in Libraries" [12]. In the following nearly two decades, scholars of library and information science have produced many knowledge service concepts and practical models [13].

Since the 20th century, with the rapid development of information technology, libraries have begun the process of digitization, and knowledge services have undergone revolutionary changes. Traditional paper books are gradually being replaced by digital resources, and users can check the library's collection online through the library's website or mobile applications, making appointments, renewals, and so on. At the same time, the library began to provide more auxiliary services, such as reference consultation, literature search, academic writing guidance, etc. Librarians are no longer just custodians of books, but also guides of knowledge and partners in learning. They help users improve their information literacy and research abilities through training and guidance. After the rise of mobile Internet, library knowledge services have further expanded to social media platforms and mobile applications. Librarians use social media platforms to interact with users, providing online Q&A, discussion, and sharing services, and have developed some mobile applications to facilitate users to access library resources and services anytime, anywhere.

Currently, within the framework of smart library construction, the knowledge services of libraries naturally contain elements such as information technology, big data, and artificial intelligence [14], and are committed to exploring implicit knowledge hidden in explicit knowledge, with the ultimate goal of promoting the transformation of "knowledge" into "smart" [15]. Faced with the constantly changing knowledge environment, libraries have been continuously developing diversified knowledge service methods and exploring different scenarios of knowledge needs. The information technology revolution marked by digitization, networking, and intelligence has brought tremendous changes to the service environment of libraries, giving rise to the digital transformation of libraries and making them a digital information service institution. The knowledge services of libraries also exhibit characteristics such as fully data-driven content, fully covered scope, and refined services.

1. Firstly, the service content of libraries is moving towards full digitization, and even for traditional printing resources, they are gradually integrating data-based management and service processes in the process of utilization. For users, digitization has brought about changes in the way knowledge content is obtained and the dissemination effect of knowledge sharing. With the accumulation of massive and heterogeneous data from multiple sources, the information flow that users can access per unit of time has significantly increased. The energy and time required to receive information of the same scale have significantly decreased, making it objectively more difficult to identify the required information and form knowledge. This has left room for improvement in the transformation and optimization of library knowledge services.

2. In the context of data-driven scientific research discoveries, the scope of knowledge services in libraries has been greatly expanded compared to the past. It is no longer a part of disciplinary services, but extends to almost all of the library's business, achieving the so-called "ubiquitous knowledge service ecosystem" [16]. Knowledge services are no longer limited to a single form of expression, but include accurate grasp of user knowledge needs, deep development of massive resources, and proactive satisfaction of teaching and research, covering various links such as resource construction, resource disclosure, reading promotion, subject services, and consulting education.

3. Knowledge services are driven by user goals, and with more artificial intelligence technologies such as visual recognition, language processing, and natural interaction embedded in knowledge services [17], users not only need to efficiently obtain reliable and diverse types of knowledge, but their requirements for data analysis and processing also vary greatly due to different research levels and professional backgrounds. Knowledge services have become context dependent, and "comprehensive intelligent knowledge services" [18] have become a new demand.

As the field of knowledge becomes more extensive and complex, the demand for interdisciplinary and transdisciplinary knowledge from users is rapidly increasing. The future of knowledge services will present a trend of "knowledge service+" that is closely integrated with social development, diverse research perspectives, and interdisciplinary fields [19]. This places higher demands on the content, structure, and methods of knowledge services based on disciplinary classification. Libraries need to explore innovative practices in knowledge services from the perspective of interdisciplinary and transdisciplinary integration, in order to achieve more flexible and comprehensive information resource organization and knowledge discovery methods.

The Challenge of Interdisciplinary and Transdisciplinary Integration Environment to Library Knowledge Services

The library collection has always been organized and constructed based on the disciplinary system, and based on the "disciplinary - literature type" model for resource guarantee and knowledge discovery [5], which makes it difficult for libraries to achieve interdisciplinary and transdisciplinary knowledge services. When the boundaries between different disciplines become blurred, knowledge service methods based on traditional discipline classification may face problems such as difficulty in knowledge classification, complex information acquisition, insufficient support for emerging fields, and difficulty in meeting multidisciplinary knowledge needs.

The breaking of disciplinary boundaries

In the knowledge service model based on traditional disciplinary system organization and construction, there is a strict boundary between disciplinary resources, and theoretical methods are in a segmented state. In fragmented disciplinary knowledge silos, it is difficult for users to see the correlation between knowledge in different fields, and knowledge flow and innovation are limited. The development of knowledge also presents a relatively static and independent state. Currently, the disciplinary dimension is an important dimension used by libraries to match user resource needs. For areas with unclear disciplinary boundaries, libraries find it difficult to provide accurate knowledge services. In the increasingly complex and diverse field of knowledge, new models of knowledge production are taking shape, and the subject of knowledge production has undergone tremendous changes. Knowledge is rapidly generated in various application scenarios and presents a dynamic and diverse state. It is difficult for research in a single discipline to touch upon specific real-life problems, and it is also difficult to categorize the relevant knowledge of achieving a certain event into a specific disciplinary field. Knowledge itself has become interdisciplinary and Transdisciplinary, and disciplines are constantly differentiating and re integrating.

The library has close connections with researchers and serves as an academic hub for various disciplines. Services such as academic paper collection, novelty retrieval, data storage, and achievement statistics all need to go through the library. The library needs to adapt to the changes in the new knowledge environment, break down disciplinary boundaries, and stand in the intersection of disciplines and reality in order to provide a wider range of resources and services and meet the knowledge needs of users.

The acquisition, integration, and dissemination of multidisciplinary knowledge

The core requirement for libraries in the trend of interdisciplinary and transdisciplinary integration development is to acquire and integrate resources from multiple disciplinary fields. The library itself is a knowledge center that can provide a wide range of resources, but faced with diverse information such as literature, data, and tools from different disciplines, it still lacks the ability to integrate and manage these information resources, and cannot help researchers solve the problem of interdisciplinary knowledge access, let alone help them discover the relationships between knowledge from different disciplines [20]. Even for some established interdisciplinary databases, many libraries cannot provide effective tools and services to help users quickly and accurately obtain the required information.

Both interdisciplinary and transdisciplinary research require collaboration between experts and researchers from different disciplines. At present, the knowledge promotion in libraries is mainly based on subject classification, without further integrating and promoting the related knowledge between disciplines, and the driving force for cooperation and communication between disciplines is insufficient. Therefore, libraries urgently need to carry out "supply side reforms" in knowledge organization and dissemination [21],

innovate knowledge on the basis of resource integration, seek the optimal solution for efficiency and quality, that is, to achieve "smart knowledge aggregation" [22], provide users with high-quality comprehensive knowledge services and broader knowledge sharing space, and truly achieve a "one-stop" scientific research environment.

Support for emerging fields

The intersection of disciplines is often the growth point and frontier of new scientific fields, and the development process of science since modern times has clearly revealed this point [23]. Interdisciplinary and transdisciplinary research involves a wide range of emerging fields, such as artificial intelligence, big data, blockchain, and metaverse, all of which involve interdisciplinary, comprehensive, and complex social issues. The knowledge and information in these fields update rapidly, and users have a strong demand for knowledge recreation.

Libraries should leverage the advantages of intelligence agencies, establish efficient channels for information acquisition and updating mechanisms, make every effort to collect, organize, and analyze information, theories, data, technologies, and tools, improve professional databases, and track the innovative process of knowledge production in emerging fields. This requires the library itself to have the ability to quickly acquire and update knowledge, as well as the awareness of promoting innovation, and to cultivate the initiative and ability of users to acquire new knowledge, embedding services into specific knowledge demand contexts.

Sustainability of technology, resource, service updates and adaptation

The digitization and intelligence of knowledge services themselves require libraries to continuously follow up and apply new technologies to provide more efficient and convenient services. Libraries need to continuously invest funds and human resources to update technical equipment and systems, cultivate and attract talents with relevant technical capabilities. The massive and diverse resources also require libraries to enhance their level and ability in organization, management, disclosure, and presentation to meet the diverse needs of users.

In the trend of interdisciplinary and transdisciplinary integration, how to effectively manage and organize knowledge from different disciplines is a challenge. Knowledge in different fields has different characteristics and forms, and when facing diverse and flexible research objects with diverse theories and methods, especially from a transdisciplinary perspective, specific problems may follow different contexts and require the application of different disciplinary theories and methods. Therefore, libraries need to develop long-term development strategies to ensure sufficient funding and human resources to support the updating and adaptation of technology, resources, and services. In addition to exploring methods and tools for knowledge management and establishing effective knowledge management mechanisms, libraries should actively promote communication and cooperation between disciplines, and closely cooperate with academia, research institutions, etc. to promote knowledge sharing and integration, in order to improve their sustainability in the new knowledge environment and respond to increasingly complex social challenges.

Requirements for the construction of future learning centers

Currently, building a future oriented learning center has become an important direction for the intelligent transformation of libraries. The knowledge service services of libraries need to reshape service scenarios and innovate service models to meet the needs of ubiquitous, personalized, and lifelong learning scenarios [24]. From the perspective of interdisciplinary and transdisciplinary integration development, diversified knowledge resources and interdisciplinary communication platforms undoubtedly support the cultivation of learners' comprehensive abilities and innovative thinking. Based on this, future learning centers also need libraries to make efforts in the following areas.

Firstly, multidisciplinary resource integration. Provide multidisciplinary resources for the learning center to assist learners in obtaining knowledge in a one-stop manner. Secondly, transdisciplinary knowledge navigation. Assist learners in accurately and quickly locating the knowledge they need in complex subject knowledge networks, and provide resource recommendations in relevant subject areas based on learners' needs and interests. Thirdly, interdisciplinary learning support. Organize interdisciplinary learning activi-

ties, offer interdisciplinary learning courses, etc., to promote communication and cooperation among learners. Provide training on research methods and tools, literature search and analysis services, etc., to cultivate interdisciplinary thinking and problem-solving abilities. Fourthly, the construction of interdisciplinary and transdisciplinary innovation space. Establish maker spaces, digital media laboratories, etc. to provide learners with innovation venues and equipment, promoting the development of their creativity and innovation abilities.

Optimization Path of Knowledge Services from the Perspective of Interdisciplinary and Transdisciplinary Integration

Based on the above needs and challenges, libraries should redesign knowledge organization, management, dissemination, evaluation, education, and promotion systems that meet the needs of interdisciplinary and transdisciplinary integration development according to the characteristics of the new knowledge environment, integrate professional knowledge and resources from different disciplines, and provide more comprehensive, comprehensive, and in-depth knowledge services.

Knowledge management: from disciplinary based to theme based

When the resource management system built on the basis of traditional disciplinary classification cannot meet the knowledge needs of interdisciplinary and transdisciplinary fields, libraries should shift from a knowledge management model based on disciplines and literature to a knowledge management model based on themes and knowledge content: organize relevant resources from different disciplines according to theme classification, association classification, etc., decompose them into different forms and fine-grained "knowledge elements" such as facts, data, images, formulas, etc., and establish interdisciplinary theme lexicons, classification systems, and indexing tools on this basis to achieve resource description and knowledge representation.

Libraries need to rethink how to help users quickly locate and access knowledge resources related to topics, and can be built according to the following ideas. Firstly, analyze the literature, data, and user needs to identify research hotspots and thematic areas; Secondly, utilizing topic modeling techniques to extract and cluster relevant literature, forming a topic knowledge base; Thirdly, integrate the theme knowledge base and provide theme oriented information services; Fourthly, build tools such as theme navigation systems and theme search engines.

Knowledge discovery: from mining facts to mining associations

In reality, resources from different disciplines are scattered across different databases and platforms, and users need to spend a lot of time and effort searching and obtaining this information. The library has already utilized knowledge discovery for one-stop resource disclosure, but traditional one-stop retrieval cannot fully meet the needs of users for interdisciplinary knowledge. Therefore, the library should optimize the underlying logic of knowledge discovery, transform its knowledge mining approach, and shift from inclined mining of facts to inclined mining of correlations between facts.

Scholars in this field have been exploring this field. Wang Zhongyi established a conceptual association model for interdisciplinary knowledge, taking a crucial step towards interdisciplinary knowledge organization [25]. Subsequently, his team established a method for mining interdisciplinary cognitive structures based on this foundation [26]. In addition, there is a considerable amount of literature exploring how to dynamically and quickly meet the interdisciplinary and transdisciplinary knowledge and data needs of users based on the massive data integrated by libraries, providing a basis for the improvement of library knowledge discovery strategies. These documents mainly involve three aspects.

Firstly, integrate resources from different disciplinary fields, including books, journals, databases, online resources, etc., integrate these data, establish interdisciplinary knowledge bases or knowledge discovery tools, and lay the foundation for revealing the characteristics and connections of knowledge content in disciplinary fields. Secondly, using text mining, machine learning, natural language processing techniques, etc., to model and analyze the topic of text data in the knowledge base. Through topic modeling, hidden themes in text data can be discovered, and correlations between different disciplinary fields can be discovered, truly achieving disciplinary

integration. Thirdly, knowledge graph technology can provide structured representation and correlation of knowledge from different disciplinary fields. It represents knowledge in the form of a graph, showcasing the connections and intersections between different disciplinary fields through nodes and edges. Building a knowledge graph can help users better understand and discover the relationships between knowledge.

Educational consultation: from information literacy to full literacy

The interdisciplinary and transdisciplinary knowledge environment places higher demands on the knowledge literacy of researchers. One of the goals of disciplinary integration is to reconstruct the talent training system and cultivate versatile talents. Therefore, researchers should possess advanced disciplinary literacy - interdisciplinary and transdisciplinary abilities. The library undertakes the function of cultural education, and information and data literacy education has always been a part of library knowledge services, while information literacy and digital literacy themselves are interdisciplinary abilities. Libraries should, based on their unique advantages in literacy training, carry out more educational activities to enhance the comprehensive literacy of users, especially interdisciplinary cognitive and application literacy. They should actively guide users to cross disciplinary boundaries, explore interdisciplinary knowledge fields, help them master the information retrieval, evaluation, and utilization skills required for interdisciplinary research, guide them to learn tools and technologies for knowledge integration and innovation, such as knowledge management, data analysis, and visualization, and enhance their practical and innovative abilities.

Currently, interdisciplinary consulting has become the main form of library consulting services. A survey shows that 54% of university students directly propose interdisciplinary consulting needs [27]. Interdisciplinary research emphasizes the integration of knowledge from different disciplines, while transdisciplinary research emphasizes the innovation generated by integration. Both have broken through traditional disciplinary research paradigms, and libraries should no longer only provide consultation based on disciplinary classification, but should carry out customized consultation of thematic resources based on content and themes.

The cultivation of comprehensive literacy and across all disciplines consultation cannot be achieved solely by the library, which requires the library to strengthen cooperation with education departments, research institutions, etc. The advantage of libraries is that they can provide a wide range of disciplinary backgrounds and convenient communication platforms. Based on their own advantages, they should cooperate deeply with other institutions, establish academic social networks and cooperation platforms, and jointly promote the cultivation of comprehensive knowledge and the deepening of consulting services.

Collaborative promotion: interdisciplinary and cross institutional collaborative networks

Interaction and communication are the key to knowledge innovation, and interdisciplinary and transdisciplinary research is conducive to promoting interaction and communication between disciplines, and completing the exploration of a certain problem in a reasonable way. The exchange between disciplines requires a suitable platform, and libraries should take the lead in establishing an interdisciplinary knowledge management system, integrating research results, data, literature, etc. from different disciplines as the support foundation for interdisciplinary cooperation. The innovation of knowledge occurs through collisions and exchanges between different knowledge production entities. Libraries should establish interdisciplinary service teams with the participation of librarians from different disciplinary backgrounds, and delve into the process of solving problems for users. Extensive collaborative cooperation with the outside world, on the one hand, participating in inter library cooperation, standardizing standards, unifying technology, and jointly building and sharing resources; On the other hand, collaborate with different academic institutions, research centers, laboratories, enterprises, etc. to jointly carry out research projects and hold academic activities.

Building interdisciplinary and cross institutional cooperation networks requires the establishment of continuous communication and cooperation mechanisms. Libraries should timely promote the construction and development of interdisciplinary and cross institutional cooperation networks, clarify the goals, content, and responsibilities of cooperation, and ensure the sustainable development of the cooperation network.

Quality evaluation: multidimensional evaluation based on user feedback

Interdisciplinary and transdisciplinary knowledge services emphasize integrating services into the problem-solving process to avoid deviating from reality. To this end, a scientific knowledge service evaluation system should be established, which should be integrated throughout the entire process of knowledge services, and service content and methods should be dynamically adjusted based on feedback.

A quality evaluation system based on user feedback is necessary for the knowledge environment of interdisciplinary and transdisciplinary integration development. After breaking the basic disciplinary boundaries, evaluation methods within disciplines will no longer be applicable. If we want to better understand user needs and provide more personalized and accurate knowledge services, evaluation dimensions should include the richness of library resources, timeliness of services, professionalism of librarians, and comfort of facilities. For each evaluation dimension, corresponding indicators can be set to measure the performance of the library in that dimension. For example, in the dimension of resource richness, the library's collection volume and the coverage of electronic resources can be considered. In the dimension of service timeliness, user waiting time and service response speed can be considered. The evaluation methods can include user surveys, interviews, observations, etc. By collecting user opinions, the performance of the library in various dimensions can be evaluated.

Knowledge services should be personalized and proactive in order to achieve comprehensiveness and diversity. The evaluation system also needs to form a feedback loop mechanism to enable libraries to respond promptly and make reasonable improvements. Libraries can establish mechanisms for collecting and analyzing evaluation data, such as setting up online feedback forms, suggestion boxes, etc. to collect user evaluation data. By using data mining and text analysis methods, valuable information can be extracted from user feedback data, providing support for library decision-making and improvement.

Conclusion

Interdisciplinary and transdisciplinary approaches are an adaptation of human learning methods and habits to the drastic changes in the information age. They integrate knowledge and methods from different disciplinary fields in order to solve practical problems. However, it should be noted that the integration of disciplines cannot erase the value of specialties and discipline establishment, which leads to the pursuit of superficial and generalized knowledge, and the opposite of specialization. The interdisciplinary and transdisciplinary knowledge services provided by libraries should be problem oriented knowledge restructuring, which does not judge the effectiveness of services based on disciplinary boundaries. It breaks through the shackles of disciplinary boundaries for knowledge services, which is conducive to the deepening of services and the healthy development of knowledge itself.

As a storage and dissemination center for knowledge resources, libraries have abundant interdisciplinary resources, providing necessary support for interdisciplinary and transdisciplinary research. In the process of interdisciplinary and transdisciplinary integration and development, libraries should face challenges, adjust and enhance the level of knowledge services, adapt to the new knowledge environment, and also highlight their resource center attributes and value.

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