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Challenges and Countermeasures Faced by Library Management in Vocational Undergraduate Colleges

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Abstract: The rapid development of vocational undergraduate education has put forward new requirements for the management of its libraries. However, most libraries in vocational undergraduate institutions are currently facing structural predicaments such as an unbalanced resource structure, lagging service paradigms, and insufficient governance capabilities. This paper systematically analyzes the causes and manifestations of these predicaments from four dimensions: functional positioning, resource construction, service supply, and governance capabilities. It proposes the construction of a dual-track resource system of "academic literature + technical literature", an embedded discipline service model oriented towards the integration of industry and education scenarios, and a ubiquitous service extension strategy adapted to the rhythm of work-study alternation. On this basis, it further explores the construction paths of "dual-qualified librarians" capability reconstruction, a collaborative resource co-construction and sharing mechanism between schools and enterprises, and a dynamic evaluation system driven by user needs. The research aims to promote the functional leap of libraries in vocational undergraduate institutions from traditional literature managers to enablers of industry-education integration, providing theoretical and practical references for the transformation of libraries in similar institutions.

1. Introduction

The establishment and development of vocational undergraduate colleges is an important institutional achievement of the type-based reform of vocational education in China and a strategic choice to meet the demand for high-level technical and skilled talents in industrial upgrading [1]. However, compared with the rapid advancement of educational practices, the libraries of vocational undergraduate colleges, as an important component of the educational support system, lag behind in terms of management concepts and service models [2]. Essentially, the challenges faced by libraries in vocational undergraduate colleges have systematic characteristics. In terms of resources, the collection structure generally shows an imbalance of "emphasizing academic content while neglecting technical content", with a severe shortage of technical literature such as industry standards, technical manuals, and enterprise case libraries. In terms of services, libraries still mainly

focus on literature lending for classroom teaching and have not been integrated into the key scenarios of industry-education integration, providing insufficient support for students' internships, technological research and development, and enterprise collaboration. In terms of personnel, the knowledge structure of librarians is mainly based on library science, lacking the ability to recognize and develop industrial technical information sources. These three aspects are intertwined, forming deep-seated obstacles that restrict the functional performance of libraries. This paper aims to systematically analyze the current predicaments of library management in vocational undergraduate colleges and propose systematic countermeasures from three dimensions: resource system reconstruction, service model transformation, and governance capacity enhancement, with the expectation of providing theoretical references and practical guidance for the transformation and development of libraries in vocational undergraduate colleges.

2. The Era Context and Practical Dilemmas Faced by Libraries in Vocational Undergraduate Colleges

2.1 The Urgent Requirement for Functional Reconfiguration of Libraries in Response to the Educational Positioning of Vocational Undergraduate Colleges

To understand the predicament of libraries in vocational undergraduate colleges, it is essential to return to the fundamental attributes of vocational undergraduate education. Vocational undergraduate education is distinct from both regular undergraduate and higher vocational education. Compared with regular undergraduate education, its goal is not to cultivate academic researchers but to produce high-level technical and skilled talents for the front lines of production, construction, management, and services, often referred to as "field engineers" or "technicians". Compared with higher vocational education, it demands a higher educational level, requiring students to not only master proficient operational skills but also possess strong technical comprehension, process optimization, and cross-disciplinary knowledge transfer capabilities. This dual nature of "higher education" and "vocational orientation" determines that the educational logic of vocational undergraduate colleges has a distinct composite characteristic [3].

This educational positioning imposes an urgent requirement for the functional reconfiguration of libraries. In regular undergraduate colleges, the core function of libraries is to support academic research and general education, with collections mainly consisting of academic monographs, journal articles, and dissertations, and services centered around document lending, reference consultation, and subject intelligence analysis. In higher vocational colleges, the core function of libraries is relatively focused on supporting skills teaching, with collections mainly comprising textbooks, exercise books, and operation manuals. However, libraries in vocational undergraduate colleges cannot simply replicate either of these models. They need to support the cultivation of students' theoretical literacy while not neglecting the knowledge demands of technical and skill training; they need to serve on-campus teaching as well as be integrated into the entire process of school-enterprise collaborative education. Therefore, the functional positioning of libraries in vocational undergraduate colleges should shift from the traditional "document center" to a trinity of "knowledge hub + technical information platform + industry-education integration link".

2.2 The Dilemma of Imbalance between "Academic" and "Technical" in Resource Construction

The ambiguity in functional positioning directly leads to structural imbalance in resource construction. Observations of the collection data of libraries in multiple vocational undergraduate colleges reveal a common phenomenon: academic monographs and theoretical textbooks dominate

the collection, while technical standards, patent documents, product data manuals, process norms, skill operation guides, and enterprise case libraries are severely lacking. This "emphasizing academic over technical" collection structure is clearly at odds with the talent cultivation goals of vocational undergraduate education. The reasons for this imbalance are multifaceted. From the perspective of the procurement mechanism, libraries' resource procurement has long relied on traditional book orders and database packages, while resources such as technical standards, product manuals, and enterprise case studies are often not included in regular book lists and lack mature commercial database products. From the perspective of librarian capabilities, the majority of librarians have received general education in document and information management and lack knowledge of specific industry technical information sources, not knowing "what to buy" or "where to buy". From the perspective of evaluation orientation, some colleges take external evaluations such as the undergraduate teaching qualification assessment or the attainment of educational conditions as the guiding principle, and these evaluation indicators often focus more on quantitative metrics such as the average number of books per student and the annual increase in paper documents rather than the alignment of the collection structure with professional needs. This "quantity-oriented" approach further exacerbates the disconnection between resource construction and actual needs. A more profound issue lies in the inherent obstacles in obtaining technical documents [4]. Industry standards are typically issued by standardization management institutions, are expensive, and are updated frequently; enterprise technical documents and equipment manuals are often regarded as commercial secrets and not made public; patent documents, although theoretically accessible, lack targeted screening and secondary processing for educational scenarios. These problems are beyond the capacity of libraries alone to solve and require collaborative efforts at the school level, industry level, and even the policy level.

2.3 The Misalignment Dilemma between Service Supply and Industry-Education Integration Demands

In addition to the imbalance in resource structure, the lagging service model also constitutes a prominent predicament faced by libraries in vocational undergraduate colleges. Industry-education integration is the core logic of vocational undergraduate education, and the entire process of talent cultivation involves in-depth interaction between schools and enterprises. However, the service design of most libraries still mainly follows the "wait for readers" model oriented towards on-campus classrooms, lacking embedded support for key scenarios of industry-education integration. This misalignment is manifested in three dimensions. First, insufficient support for school-enterprise collaborative education. In forms of school-enterprise cooperation such as order-based classes and modern apprenticeships, enterprise mentors often undertake some teaching or internship guidance tasks. However, these enterprise mentors usually do not have borrowing privileges for the school's library or remote access to its digital resources. When they need to consult teaching reference materials or technical literature, they encounter institutional "information barriers". Second, the absence of knowledge services for students during their internship stage. Vocational undergraduate students need to complete long-term on-the-job internships in enterprises [5]. On the internship positions, the problems they encounter are often not "what is said in the textbooks", but rather "how to troubleshoot this fault" or "how to set this process parameter". Third, weak information support for technological research and development and technology transfer. Vocational undergraduate colleges also undertake the functions of technological research and development, process improvement, and technology transfer to serve small and medium-sized enterprises. When teachers and cooperating enterprises are conducting horizontal projects, they need in-depth information services such as patent analysis, technology trend monitoring, and

competitive product information retrieval. However, the vast majority of libraries have not yet established the corresponding service capabilities. Their subject services still remain at the academic support level of paper collection and citation, and submission guidelines, and are far from the in-depth mining of industrial technology information.

3. Systematic Reconstruction of the Resource System and Service Model of Libraries in Vocational Undergraduate Colleges

3.1 Construction of a Dual-track Resource System of "Academic Literature + Technical Literature"

The systematic reconstruction of the resource system is the material basis for service transformation. As mentioned earlier, the current collection structure of libraries in vocational undergraduate colleges shows a significant imbalance of "emphasizing academic literature over technical literature", and the fundamental reason for this imbalance lies in the narrow understanding of the knowledge demands of vocational undergraduate education. Vocational undergraduate students need both academic literature to support their theoretical literacy and sustainable development capabilities, and technical literature to support their technical understanding and process optimization capabilities. Neither can be neglected. Therefore, the direction of reconstruction is not to replace academic literature with technical literature, but to establish a dual-track resource system of "academic literature" and "technical literature". "Academic literature" refers to the traditional types of literature that support the construction of disciplinary knowledge systems, including academic monographs, journal articles, dissertations, conference papers, research reports, etc. "Technical literature" refers to knowledge carriers directly facing technical applications and production practices, which have significant differences in format, language, and functional orientation from academic literature [6].

The construction of a dual-track resource system requires corresponding procurement and cooperation mechanisms. In terms of procurement mechanisms, the practice of relying solely on book orders should be changed, and a diversified collection channel adapted to the characteristics of technical literature should be established. Industry associations, standardization management institutions, equipment suppliers, and cooperative enterprises should all become important sources of resources. In terms of cooperation mechanisms, libraries can jointly build a "technical literature sharing library" with leading enterprises in the industry. Enterprises contribute de-identified technical documents and case libraries, and libraries are responsible for digital processing, classification indexing, and long-term preservation, and open them for use by teachers and students within the framework of intellectual property protection agreements. In addition, a dynamic update mechanism for technical literature should be established to avoid the problem of information aging caused by "one-time procurement and long-term non-updating".

3.2 Embedded Disciplinary Service Model Oriented to Industry-Education Integration Scenarios

There is a significant mismatch between current library services and the demands of industry-education integration. The essential reason lies in the fact that service design still centers on "document management" rather than "user scenarios". The key to breaking the deadlock is to shift from the traditional model of "waiting for readers to come" to an embedded disciplinary service model that "enters the front lines of teaching and research". Specifically, a differentiated embedded service matrix should be constructed around three core scenarios: professional teaching, technology research and development, and student training and internships [7].

The first scenario is professional teaching. In vocational undergraduate colleges, new teaching models such as project-based learning, case teaching, and work manual-based textbook development are increasingly popular, which pose higher demands on the library's literature support. The traditional method of "listing reference books and students borrowing them on their own" is no longer sufficient. Library subject librarians should proactively embed themselves in course teams and participate in the entire process of teaching design. The second scenario is technology research and development. Vocational undergraduate colleges bear the responsibility of serving the technological upgrading of small, medium, and micro enterprises. The projects carried out by teachers and students, such as horizontal research, technological breakthroughs, and process improvements, often require in-depth technical information support. However, the vast majority of libraries have not yet established the corresponding service capabilities. Libraries can set up "industrial technology intelligence service stations", led by subject librarians with industrial cognition capabilities, to provide professional services such as patent analysis, technology trend monitoring, competitive product information retrieval, and standard novelty search for research teams. Such services go beyond the scope of traditional reference consultation and are closer to technical intelligence analysis, requiring higher capabilities from librarians but also making more significant contributions. The third scenario is student training and internships. Vocational undergraduate students have long internship periods, scattered positions, and prominent immediate knowledge demands. Libraries can establish an "Internship Knowledge Support Platform", pre-arranging resources such as operation norms, safety standards, troubleshooting manuals, and common parameter tables according to professional directions and typical positions, and setting up a quick search channel. When students encounter specific problems at the internship site, they can quickly retrieve the required information through mobile terminals. Additionally, a "Common Internship Problem Database" can be established to accumulate and share typical problems and solutions encountered by previous students during internships, forming a virtuous mechanism of "student mutual assistance and knowledge accumulation".

3.3 Ubiquitous Service Extension in Time and Space to Adapt to the Rhythm of Work-Study Alternation

The embedded service model focuses on the scene-based adaptation of service content. However, for these services to truly reach users, systematic extension in terms of service accessibility in time and space is also necessary. The alternating learning rhythm of vocational undergraduate students, which involves "on-campus study + enterprise training + on-the-job internship", determines that they cannot rely on fixed library opening hours and physical spaces like regular undergraduate students. Time extension is the fundamental dimension. 24-hour unobstructed access to digital resources is already a basic requirement. Further optimization lies in the application of intelligent customer service. When students have the need to query technical documents after late-night internships, they should not be hindered by the lack of human response. An intelligent question-answering system based on artificial intelligence can be introduced to provide immediate responses to common questions, while complex issues can be transferred to human handling with a commitment to reply the next day. Spatial extension is the core dimension. "Mobile Library Service Stations" should be set up in key cooperative enterprises and off-campus training bases, equipped with carefully selected technical manuals, operation norms, and other paper reference books, and provide remote access terminals for digital resources. For scattered internship sites without the conditions for physical stations, virtual private networks or unified identity authentication systems can be used to ensure that students can access core resources from any location. Terminal extension is the key at the operational level. Mobile terminals have become the preferred channel for students

to obtain information. Professional databases and self-built resources of libraries must be adapted to the usage habits of mobile phones.

4. Governance Capacity of Vocational Undergraduate University Libraries and Professionalization of Librarians

4.1 Reconfiguration of Librarians' Capabilities in Accordance with the "Dual-Teacher" Requirements

Vocational undergraduate universities have set the "dual-teacher" requirement for their teaching staff, meaning they should possess both theoretical teaching skills and practical guidance capabilities. Similarly, librarians serving vocational undergraduate universities cannot remain at the traditional position of being merely literature management experts. Instead, they should become "dual-teacher" librarians, proficient in library operations and possessing certain industrial cognition and technical information processing capabilities. This capability reconfiguration serves as the foundation for the transformation of vocational undergraduate libraries.

The "dual-teacher" librarian's capability structure can be decomposed into three levels. The first level is the ability to manage literature and information, which is the core basic skill of librarians, including traditional business skills such as literature classification and cataloging, database management, information retrieval teaching, and reference consultation. The second level is the ability to understand industrial technology, which is the key difference between vocational undergraduate library librarians and ordinary undergraduate library librarians. Specific requirements include: understanding the technical logic and knowledge structure of the school's main majors, being familiar with the distribution of technical information sources in related industries, and being able to understand the organization and retrieval characteristics of technical literature. The third level is the ability to provide collaborative services between industry and education, that is, being able to communicate effectively with enterprise mentors, professional teachers, and technical personnel, accurately understanding the information needs of all parties in different scenarios, and precisely matching corresponding resources and services.

The cultivation of "dual-teacher" librarians cannot be achieved solely through traditional library science education. It must be accomplished through on-the-job training and practical exercises. Feasible approaches include: arranging subject librarians to periodically attend main professional courses to understand the teaching content and technical points; organizing librarians to conduct short-term visits or temporary assignments in cooperative enterprises to understand the literature demand scenarios in the production site; encouraging librarians to participate in industry technical conferences and training to establish a network of industry information sources. These measures require institutional support at the school level, such as including enterprise temporary assignments in librarians' workload calculation and professional title evaluation, rather than requiring librarians to "self-study" in their spare time.

4.2 Establishing a collaborative library resource co-construction and sharing mechanism between schools and enterprises

Many challenges faced by vocational undergraduate libraries cannot be solved solely by the internal resources, especially structural problems such as limited access to technical literature resources and difficulties in accessing enterprise information sources. The solution to these problems requires the introduction of external forces and the establishment of a collaborative resource sharing mechanism between schools and enterprises. The core logic of school enterprise collaboration is "mutual benefit". The school library needs internal resources such as technical

documents, product data, and case libraries from enterprises to supplement its collection; Enterprises also need academic resources, literature search services, and information analysis capabilities from schools to support their research and training needs. Based on this bidirectional demand, a collaborative model of "three party co construction" can be designed, in which school libraries, cooperative enterprises, and industry associations jointly establish the "Industry Education Integration Resource Construction Committee". The committee is responsible for formulating a framework agreement for resource co construction, clarifying the rights, obligations, and participation methods of all parties involved.

4.3 Establishing a dynamic assessment and iterative optimization mechanism driven by user needs

Vocational undergraduate education is still in a period of rapid development. Professional settings are being adjusted, teaching models are being explored, and cooperative enterprises are changing. If the library management system is in a static mode of "one-time construction and long-term invariance", then no matter how perfect the initial plan is, it will inevitably gradually deviate from the real needs in practice. Therefore, a complete set of dynamic assessment and iterative optimization mechanism driven by user needs must be established to keep the library management in a virtuous cycle of "perceiving needs - responding and adjusting - evaluating feedback - continuous improvement".

The core of this mechanism is the construction of a demand perception system. The traditional demand perception methods are mainly passive - reader recommendation for procurement, sporadic feedback, and regular reader symposiums. Although these methods are necessary, they have problems such as response lag, sample deviation, and coarse granularity. On this basis, a data-driven demand analysis system should be established. Through systematic analysis of user behavior traces such as borrowing data, digital resource access data, literature transfer request data, and reference consultation question records, hidden demand patterns can be discovered. Based on demand perception, a closed-loop management response mechanism needs to be established. Resource procurement shifts from "annual plan-driven" to "demand data-driven", shortening the cycle from demand identification to resource arrival. Service design shifts from "library internal conception-driven" to "user scenario-driven", and regularly organizes cross-departmental service demand research for three core user groups - teachers, enterprise mentors, and intern students - for stratified interviews or questionnaire collection. Space and facility configuration shifts from "experience judgment-driven" to "usage data-driven", using seat reservation systems, gate entry and exit data, space occupancy sensors, etc. to identify peak hours, popular areas, and idle spaces, and dynamically adjust opening strategies and space layout.

5. Conclusion

The transformation of library management in vocational undergraduate colleges is essentially a shift in function from being a "document manager" to a "knowledge service provider" and then to an "enabler for industry-academia integration". This article demonstrates that this transformation requires systematic collaboration among the resource system, service model, and governance capability: at the resource level, a dual-track composite structure of academic and technical documents should be established; at the service level, it needs to shift from passive response to embedded support in scenarios; at the governance level, it relies on the construction of a "dual-qualified librarian" team and the establishment of a dynamic evaluation mechanism. It should be noted that vocational undergraduate education is still in a period of rapid development, and its professional settings, teaching models, and cooperative enterprises are all in a state of dynamic

change. Library management should not pursue an "enduring and unchanging" ultimate solution but should build an adaptive system that continuously perceives needs and rapidly iterates and optimizes.

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