

Postprint: Education Paradigm, Basic Characteristics, and Spatial Construction of the Future Learning Center Institute

Authors: Wan Qiao

Date: 2024-04-03T00:00:00+00:00

Abstract

[目的/意义]The deep integration of intelligent technology with education and teaching has brought about diversified transformations in education. In accordance with the developmental trends of the new paradigm of talent cultivation in the new era, university libraries need to construct diversified ecological spaces and learning scenarios through literature resource integration, spatial process reengineering, intelligent technology application, and learning support services.

[方法/过程]This study reviews the research status and construction progress of future learning centers, analyzes the new paradigm and basic characteristics of talent cultivation within future learning centers, and explores the spatial construction and service pathways for future learning centers in university libraries, including autonomous learning support spaces, education and teaching support spaces, digital scholarship support spaces, and creative innovation support spaces.

[结果/结论]Future learning centers will become an important opportunity for the transformation of university libraries from resource centers to learning centers. Through the construction of future learning centers, libraries can provide readers with personalized learning services, intelligent learning environments, precise learning platforms, and innovative learning ecosystems, exploring new models for education quality improvement and achieving the educational goals of students' autonomous learning, smart learning, and lifelong learning.

Full Text

Preamble

Author: Wan Qiao (Three Gorges University Library, Yichang 443002)

Abstract:

[Purpose/Significance] The deep integration of intelligent technology with education and teaching has brought diversified changes to education. University libraries must construct diversified ecological spaces and learning scenarios through literature resource integration, spatial process reengineering, intelligent technology application, and learning support services, in accordance with the development trend of new education paradigms in the new era.

[Method/Process] This study summarizes the research status and construction progress of future learning centers, analyzes the new educational paradigm and basic characteristics of future learning centers, and explores the spatial construction and service paths of university library future learning centers in self-learning support space, education and teaching support space, digital academic support space, and creative creation support space.

[Results/Conclusion] The future learning center will become an important opportunity for university libraries to transform from resource centers to learning centers. Through the construction of future learning centers, libraries can provide readers with personalized learning services, intelligent learning environments, precise learning platforms, and innovative learning ecosystems, explore new models for improving education quality, and achieve the educational goals of students' autonomous learning, intelligent learning, and lifelong learning.

Keywords: future learning center; educational paradigm; space construction; university libraries; artificial intelligence

Classification Number: G258.6

Document Code: A

Article ID: 1002-1248

Citation: Wan Qiao. Future Learning Center: Educational Paradigm, Basic Characteristics, and Space Construction[J]. Journal of Library and Information Science in Agriculture, 2023, 35(9): 57-65.

1 Introduction

With the rapid development and widespread application of information technology and other digital technologies, China's education informatization is currently in a critical period of integration and innovation where digital technology merges with education and teaching. The deep integration of intelligent technology with education has driven diversified reforms in teaching activities and evaluation mechanisms. In 2018, the concept of "promoting digital education" was written into the Party Congress report, and the national education digitalization strategy action was fully launched. The Ministry of Education has been advancing education informatization and integration innovation.

In its 2023 work priorities, the Higher Education Department of the Ministry of Education proposed to explore and promote the pilot of "Future Learning Centers," leveraging the advantages of university libraries, integrating various

learning resources within schools, utilizing new-generation information technology, and creating new grassroots learning organizations that support the transformation of learning methods [?]. The future learning center represents an inevitable development trend of Education 4.0 and higher education reform and transformation. It is also a frontier issue and contemporary proposition for the modernization of university libraries.

3 Future Learning Center Educational Paradigm

Under the development trend of Education 4.0, future learning centers aiming to promote autonomous, collaborative, and team-based learning require innovative learning models. New paradigms will emerge in learning space, teacher roles, course content, learning methods, and evaluation systems.

3.1 Learning Space

Future learning spaces are the overlap and interaction of physical space, virtual space, and social space. They are no longer traditional enclosed or isolated spaces. Future learning centers will eliminate uniform and standardized education models, shifting toward customized and personalized approaches. First, they break through the physical space constraints of education, exhibiting highly social characteristics. Second, they construct integrated learning spaces, forming humanized, multidimensional, and diversified spaces. In this new spacetime of interconnected everything, using new technologies such as artificial intelligence and virtual reality, future learning centers create dynamic and interactive multimodal open spaces. These include not only traditional reading spaces but also virtual VR spaces, multimedia audio-visual spaces, digital experience spaces, 3D roaming spaces, and digital twin spaces—spaces where space and knowledge merge, reality and virtuality connect, and openness and collaboration intersect.

3.2 Teacher Role

Future learning centers break through the traditional single classroom teaching model centered on teachers, instead adopting a student-centered approach. They no longer follow the path of knowledge transmission as the sole purpose, but respect students' agency and select teaching methods—whether instructive, participatory, or inquiry-based—according to students' characteristics and interests. Teachers' roles become richer and more three-dimensional: they are educators who impart knowledge and resolve doubts, learning partners who jointly explore problems, guides for beliefs and values, mentors for individualized guidance, guardians of psychological and emotional well-being, and companions for social learning. Simultaneously, teachers are not necessarily biologically human—they can also be intelligent robots. In a state of human-machine co-teaching, teachers need to establish advanced educational concepts and enhance

their comprehensive qualities, developing all-around competencies for human-machine coexistence in both virtual and real environments. In specific situations, students can act as teachers and teachers can act as students.

3.3 Course Content

Future learning centers change the traditional model of unified textbooks and standardized curricula. Standardized talent-training schools are products of the industrial era. With the rapid development of social artificial intelligence, industrial workers engaged in standardized operations will be largely replaced by intelligent technology. Strategic scientists, scientific and technological leaders, and young scientific and technological talents—innovative talents—are the strategic reserve talents for national development. Therefore, the Education 4.0 concept of personalized education and innovative teaching has emerged, and traditional learning models and teaching methods have been impacted from multiple directions. Future learning centers design personalized courses tailored to individual abilities, or develop vocational courses based on personal career development goals, or provide customized courses according to industry development needs. Students reconstruct knowledge and build their own unique course content, knowledge systems, and wisdom structures.

3.4 Learning Methods

Future learning centers feature more flexible and elastic learning forms. They encourage team-based and thematic learning methods, creating interactive learning forms that are student-centered, inquiry-based, and collaborative. Team-based learning involves finding learning partners and mobilizing learners, treating a group of students as a whole to cultivate team awareness and collaborative learning abilities. Through dialogue, debate, and other forms, group members fully discuss problems to obtain the best path to learning goals, which helps develop students' thinking abilities, communication skills, and tolerance for individual differences. Thematic learning is a form of inquiry-based learning centered around themes, breaking the fragmentation between disciplines and achieving comprehensive integration of learning content to cultivate learners' ability to discover and solve problems independently. Various free and open learning methods reflect the increasingly blurred boundaries between formal and informal learning, no longer focusing on knowledge storage but on discovering concepts and creating new knowledge during the learning process.

3.5 Evaluation System

Due to the personalized and lifelong learning mechanisms of future learning centers, their evaluation systems no longer implement the single “examination + score” assessment standard. Instead, they establish a comprehensive evaluation system for the entire process, combining process evaluation with summative evaluation, quantitative evaluation with qualitative evaluation, and self-evaluation

with peer evaluation. Evaluation rights are no longer concentrated in one entity; the right to certify can be entrusted to third-party institutions. Relying on scientific learning data, a comprehensive assessment system can evaluate and recognize learning outcomes based on learning processes, innovative achievements, etc. This ensures the scientificity, fairness, and effectiveness of evaluation. Students can open education accounts in the system to record their lifelong credit files, promoting the educational goal of lifelong learning.

4 Basic Characteristics

4.1 Smart Perception

Supported by digital and intelligent information science and technology, future learning spaces organically integrate various resources. They sense and transmit user behavior data and interaction data, achieving multi-event linkage states. Through real-time analysis and adjustment, they predict reader needs and personality traits, perceive users' learning needs in culture, academics, and leisure, and then reasonably recommend matching resources and services—such as resource recommendations and information references—according to cognitive laws of knowledge. By creating precise user profiles of habits, interests, and inspirations, users can experience more thoughtful services within this system, enhancing their sense of deep participation, full sensory experience, and three-dimensional acquisition during knowledge acquisition and creation.

4.2 Ubiquitous Diversity

User activities are the main theme in the comprehensive learning ecosystem of future learning centers. To achieve ubiquitous diversity, future learning centers implement diversified learning systems and flexible evaluation systems. Learning modes are hybrid and diversified, learning scenarios are personalized and diversified, and learning conditions are intelligent and diversified. The education department no longer manages uniformly; instead, it combines social evaluation. User learning activities are not single choices. Future learning centers, centered on readers, construct ubiquitous and diversified learning ecosystems that combine learning with activities, exploration with experience, and expansion with innovation, such as digital fusion resources, personalized learning, experiential learning, immersive learning, and smart inclusive services.

4.3 Virtual-Real Integration

Under the application of modern educational technologies such as the Internet of Things and metaverse, future learning centers skillfully combine physical space with virtual space, creating a barrier-free learning environment with no boundaries for learning. They build an open campus ecological structure that is collaborative and connected, linking users with spaces, users with resources, and

spaces with spaces. Real space and virtual space achieve integration through the intermediary of “people + mobile terminals + cloud computing + artificial intelligence.” Learners are in a mixed space where virtual and real merge, with unrestricted time and space, ubiquitous course content, and diversified evaluation systems.

5 University Library Future Learning Center Space Scenarios

University libraries must explore new user needs and focus on the design and construction of multi-functional and cultural service functions in space building. The future learning center of university libraries should rely on space to establish a comprehensive learning space system centered on self-learning support space, education and teaching support space, digital academic support space, and creative creation support space. This creates a diversified learning ecological scene integrating reading, teaching, experience, participation, exploration, collaboration, and creation, gradually making the university library a participant and collaborator in university education, research, and management activities. This is a major opportunity for libraries to return to the center of university education.

5.1 Self-Learning Support Space

The library’s spatial environment should have an atmosphere that encourages and stimulates learning enthusiasm. Future learning centers can provide users with a sense of transmission, learning value, and autonomy through the reshaping of physical space and humanistic environment. In spatial reorganization and division, university libraries shift from a collection-focused reading room perspective to a human-oriented perspective of space utilization and resource services. According to students’ learning patterns and individual needs, they set up functional areas with different positioning, such as reading and broadcasting spaces with online teaching and classroom analysis functions, music appreciation spaces, 3D roaming halls, iLibrary Spaces, PBL Spaces, and other emerging personalized spaces. These create multidimensional spaces that combine virtual and real, experience and leisure, creating exclusive and shared spaces. For example, Singapore’s Nanyang Technological University Learning Hub divides learning areas, experimental areas, etc., creating dynamic and static combined learning spaces, learning commons, research commons, and dedicated commons. Self-learning support space reflects the library’s multi-dimensional extended delivery service.

5.2 Education and Teaching Support Space

Smart education space is a new form of current educational development and a composite learning development space. Education and teaching support space

advocates not centralized lectures but connecting physical and cyberspace through educational platforms, achieving diversified teaching methods and organizational forms. For example, the University of Minnesota Library's Magrath branch built a new learning space in 2006 that provides peer education services through multimedia equipment and online resources, offering peer mentor and peer research consultant online consultation services. It can provide explanations for over 250 courses in terms of courses and achievement display. Smart education space features intelligent blackboard writing, real-time feedback, and can construct three-dimensional learning scenarios with precise data recording for resource sharing and data analysis. It provides intelligent classroom analysis and diagnosis for teachers to improve teaching effectiveness.

In terms of blended teaching, it supports the construction of teaching video libraries, MOOC and micro-course recording, and one-stop production. For example, Xi'an Jiaotong University Library has built a collection-based learning platform based on knowledge graphs, providing intelligent and diversified spaces for teaching according to knowledge themes and cognitive relationships. Tsinghua University's music appreciation area, Wuhan University's 3D roaming hall, Xi'an Jiaotong University's iLibrary Space and PBL Space, and other new multidimensional spaces create virtual-real combined, experience and leisure integrated environments. The University of Science and Technology of China Library, which established a future learning center earlier, has a course recording studio and video production room mainly used for recording high-quality teaching videos such as excellent video open courses and micro-courses, recording an average of 3,000 class hours of courseware annually. It regularly conducts MOOC teacher workshops and campus ambassador exchange activities. Denmark Technical University Library's DTU Media Lab provides comprehensive teaching support services with professional teams, including teaching video production and online or blended teaching activity planning, fully supporting teaching needs. Smart classrooms provide teachers with conditions such as digital courses and research data, meeting the needs for collective discussion and collaborative office work. Education and teaching support space reflects the library's technology-integrated extended delivery service.

5.3 Digital Academic Support Space

Digital academic support space is the digital information service provided by libraries to support academic research and output. It is not only an academic digital space but also an intermediary information service platform, mainly composed of high-quality professional academic service teams. It uses information technology to create a digital academic environment and services for users, focusing on multi-element literacy and stimulating community vitality. In terms of resources and conditions, digital academic space provides users with digital academic tools and methods, scientific data and literature, and visualized digital environments by configuring modern technologies such as 3D, building digital museums for display, interaction, and storage, forming digital memory. For ex-

ample, Wuhan University Library's Creative Innovation Center, Tsinghua University Library's Innovation Laboratory, and 3C Maker Space promote knowledge circulation and the transformation of students' creative knowledge.

In terms of literacy and professional services, libraries cultivate users' data awareness, digital humanities, data ethics, digital judgment, and abilities in tracking disciplinary frontiers and intelligence measurement analysis. They provide professional services in intellectual property support to cultivate users' information value-added and academic output capabilities, encouraging knowledge innovation and achievement transformation. For example, Shanghai Jiao Tong University provides intelligence measurement and think tank services, offering situation analysis and project support for various disciplines. The University of Science and Technology of China has built an iGEM training base, providing full-process data analysis and intellectual property services for academic competition teams through the "exclusive space +" service model, helping competition teams achieve excellent results. Digital academic support space reflects the library's information value-added extended delivery service.

5.4 Creative Creation Support Space

If intelligent technology and space management are the first-level services of future learning centers, and knowledge service and academic service are the second-level services, then cultural creativity and technological creation are the third-level services. The creative creation support space of university libraries is a comprehensive maker space that supports teachers and students in knowledge innovation, cultural creativity, and technological creation activities. It is not only the library's task but also the entire university's talent training mission. Libraries need to cooperate with colleges and departments to coordinate and form a joint force in science education, integrating and sharing resources, collaborating and using technology, cross-integrating disciplines, and exchanging evaluation systems. Creative creation support space provides panoramic support for innovators, cultivating users' abilities in information value-added, academic output, and research transformation, reflecting the library's extended delivery service for innovation output and transformation.

6 Conclusion

The future learning center will become an important opportunity for university libraries to transform from resource centers to learning centers. It is an innovative starting point for university libraries to achieve spatial reengineering and service upgrading, and also an important practice for high-quality development of higher education. However, future learning center construction is not a standardized or one-size-fits-all model. Each university must "put people first," investigate and analyze the demand characteristics and behavioral habits of its teachers and students, the library's current situation, and the overall bud-

get, balancing needs and library conditions while highlighting key points and characteristics. At the same time, future learning center construction is not simple spatial reengineering or technological innovation, but the construction of a brand-new campus learning ecosystem and the exploration of a completely new university student learning model. University libraries must actively adapt to the new education paradigm of the Education 4.0 era, establishing technological, intelligent, and digital education scenarios and diversified, personalized teaching models in the process of integration and innovation, to achieve the educational goals of students' autonomous learning, intelligent learning, and lifelong learning.

References

- [1] Ministry of Education of the People's Republic of China. Key Work Points of the Department of Higher Education in 2023[EB/OL].[2023-06-15].http://www.moe.gov.cn/s78/A08/tongzhi/202303/t20230329_1053339.html?eqid=c3dc76460000906200
- [2] ZHU Y X. Future School: Redefining Education[M]. Beijing: CITIC Publishing House, 2019: 31-66.
- [3] ZHU Y X. Learning Center in China[M]. Beijing: China Renmin University Press, 2020: 35-97.
- [4] ZHANG J B, XU Y P, ZHOU Q, et al. Future Learning Centers: A Study on Libraries' Role Reorientation, Function Reconstruction, and Practical Innovations[J]. Journal of Library and Information Science in Agriculture, 2023, 35(6): 43-50.
- [5] CAI Y C, ZHOU Q, YAN D, et al. Scenario-based Construction of Future Learning Centers for Education 4.0[J]. The Library Journal, 2023, 42(9): 12-22.
- [6] YANG J, HE C, WEI J X, et al. Exploration and Practice of Future Learning Center in the Context of Smart Library[J]. The Library Journal, 2023, 42(9): 23-28, 43.
- [7] FAN Y F, LI C, WANG Q Q, et al. Reconstruction and Service Practice of Future Learning Center in Academic Libraries—A Case Study of the University of Science and Technology of China Library[J]. Journal of Academic Libraries, 2022, 40(4): 5-11.
- [8] CHEN J L, SHAO Y, ZHANG H L, et al. The Frontier Issues and Contemporary Propositions of Academic Library Modernization: Interpretation of the Compass of Academic Library Modernization (CALM) Report[J]. Journal of Library Science in China, 2022, 48(1): 17-28.
- [9] QIN C J, DU Z H. Service and Practice of New Learning Space in the Library of the University of Minnesota Twin Cities[J]. Research on Library Science, 2021(11): 91-95.

- [10] LUO Y H. The Spaces and Outreach Services of Academic Library—A Case Study of the Lanchester Library[J]. Journal of Academic Libraries, 2019, 37(5): 45-52.
- [11] ZHAI X F. Research on the Service Function of the Library's Future Learning Center from the Perspective of Full Life Cycle[J]. Jiangsu Science and Technology Information, 2023, 40(10): 37-39.
- [12] DONG G Q. Study on Multi-dimensional Space Service Design of University Libraries: A Case Study of Nanyang Technological University Library[J]. Library Development, 2018(6): 74-80.
- [13] HUANG R H, JIANG Y M. Constructing Future Learning Centers in Academic Libraries: Global Progress[J]. Library Journal, 2023, 42(9): 4-11.
- [14] China University of Petroleum. Future Learning Center Innovation and Development Forum Held[EB/OL].[2023-06-10]. <https://news.upc.edu.cn/info/1993/111348.htm>.
- [15] China Daily. Academic Salon on Future Learning Center Construction Held[EB/OL].[2023-06-18]. <https://baijiahao.baidu.com/s?id=1768664424144189514&wfr=spider&for=pc>.
- [16] Shanghai Normal University. Seminar on Future Learning Center Construction Under Digital Transformation Background Held at Our University[EB/OL].[2023-08-28]. <https://www.shnu.edu.cn/0e/2a/c279a790058/page.htm>.
- [17] Xi'an Jiaotong-Liverpool University. Xi'an Jiaotong-Liverpool University Held Seminar on Library Future Learning Center Practice and Exploration[EB/OL].[2023-08-28]. <https://lib.xjtlu.edu.cn/node/1288>.
- [18] ZHONG L X. New Paradigm of Learning Space in the Future[J]. Shanghai Education, 2021(3): 24-25.
- [19] CAI L C, ZHANG X M. Challenges of Intelligence Education and Teachers' Coping Strategies[J]. Curriculum, Teaching Material and Method, 2020, 40(12): 131-136.

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

Source: ChinaXiv — Machine translation. Verify with original.