

Research on the Problems and Development Strategies of the Makerspace in the Application Type University Library

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Abstract—The building of Makerspace in the university library is a new service mode that transcends the traditional library. Building a Makerspace is an important opportunity for the service transformation of the Library under the new situation. The construction of Library Makerspace will bring inspiration to the innovation of library service concept, and find new entry points for improving the service of readers. Based on the analysis of the problems existing in the libraries of application oriented university libraries in China, this paper puts forward strategies for development, aiming to provide references for the construction of innovation space, which is of great significance for the development of new library services.

Key words—Library, Makerspace, development strategy, sustainable development, service model.

I. INTRODUCTION

The term "Makerspace" originated from "Make Magazine". In 2009, Canadian writer Cory Doctorow, in his book, "Makers", carried on the imagination and the description about "Makerspace". He accurately foresees the future creation of the space "revolution". Then, the Maker movement was rapidly becoming a wave that swept the world. The establishment of a passenger space, is not only the natural extension and service function of library development, but also the requirement of sustainable development of libraries [1]-[10]. It is creating innovation needs. Therefore, the establishment of the library Makerspace is creative, innovative, entrepreneurial activities to provide intelligence, places and services to support the unshirkable social responsibility.

As a special functional department of University, libraries have a unique function in personnel training, scientific research and serving the society. Their service orientation needs to adapt to the training objectives, educational philosophy, campus culture and training mode of the University. Application-oriented universities aim at training applied and technological talents. Their curriculum settings are more close to the needs of society and market, and attach importance to the development and transformation of research results. If the library only carries out the traditional services such as collecting, sorting, transferring and borrowing, it is clear that it is difficult to meet the

requirements of the development of the applied undergraduate colleges. Especially in the new information technology environment, the library has the danger of being marginalized. And creating space for users to focus on collaboration and sharing, and advocating transformation of knowledge from static to dynamic is an important opportunity to promote library service innovation in application-oriented universities. The connotation of the creation space coincides with the library's core value of knowledge service based on literature and information resources. The library has become an ideal field of practice for launching customer service. Nevertheless, at present, some problems existing in the practice of domestic library of the application oriented universities affect their sustainable development, which needs further discussion and solution.

II. THE PROBLEMS OF MAKERSPACE IN THE LIBRARY OF CHINESE APPLIED UNDERGRADUATE COLLEGE

Through the investigation and comparison of the University Library at home and abroad Makerspace service, found that university libraries in China hit some special problems in the practice of customer service space, re-planning problems, such as physical space construction funds shortage, personnel issues, security issues and so on, hinder its further development.

A. Re-planning of Physical Space

It can be seen from the open mode of the University Library Maker service that most of the library is either taken to set up to make room in the service module under the existing Makerspace practice and customer service, or set up in addition to the existing service module independent Makerspace to carry out a Maker service. Because the library each applied undergraduate colleges is the main business for many years the traditional "service", the physical space already library setting, regardless of its regional feature set, or circuit toward the people's habits, these physical space related settings has been deeper in the hearts of the people. To open up the region or merge library physical space construction Makerspace with large obstacles. At the same time, some Makerspace project will produce some waste and "noise" caused by relatively noisy situation, the "static" library mainly

launched a challenge. How to plan the existing physical space and provide a viable and sustainable environment for creating user space is a difficult problem facing the libraries of applied undergraduate colleges.

B. Lack of Funds

The construction of Makerspace is not only the construction of a physical space, but also requires specific tools and venues. Therefore, the purchase of equipment, the layout of the site, and the construction of literature resources need the injection of funds. Creating customer space is a new service mode. It can only be put into practice after the investigation and argumentation by the competent department. At present, most libraries do not have special funds to create customer space. Physical space and equipment are the basic skeleton of the creation space of university library. The size of the space and the overall equipment are the foundation of the development of the customer space, which determines the depth and breadth of the service content. For the domestic library of applied undergraduate colleges, the library operating funds most sources of financial budget in the country, and the budget is certain, therefore, construction of comprehensive functions, advanced technology and equipment, professional service personnel Makerspaces are limited by funding problems in a certain extent to the University library. Passenger space construction funds to do the planning of a library, to ensure the normal investment Makerspace project. On the other hand, the equipment maintenance and upgrade the follow-up funding additional to budget, except for the competent authorities to continue to invest, but also to cooperate with the relevant local organizations and institutions to actively seek sponsorship and donations. If creativity is converted into a product, a cooperative organization or organization can achieve the goal of mutual benefit and win-win.

C. The Comprehensive Literacy of the Service Librarians Is Not High, and the Personnel Are Limited

Provide service in Makerspace librarian should not only have reference, community coordination, Maker training and other skills, but also need to have good with experts and Maker tutor communication and coordination skills, pay attention to the service in the field of solid natural science knowledge and real timely. Understand the service record development and dynamic off projects. This is the current short board the domestic library of Applied Undergraduate Colleges most record Maker services librarians.

D. Safety Problem

The main participants of University Library and space are students. If these students without special training on safety and training of Makerspace in some hidden safety problems of hand tools, such as knives, manual lathes, hand grinding, laser cutter, lack of awareness or emergency measures, it may lead to some damage.

E. Single Service Mode

It is the most important service mode for university library to create sites, create seminars, training, exhibitions and other information resources, and create venues for users. The existing domestic application undergraduate library library has no laser cutting machine, CNC machine tools, lathes, milling machines and other tools. As a workshop space has not yet appeared.

F. Lack of Management Norms

Foreign library Makerspace formed earlier than China. It has formed a relatively cool model, such as the Cleveland library Tech Central established the perfect rules and regulations, the contents related to health, safety, management and supervision, and through the recruitment of volunteers, hire experts and technical personnel of the way of strengthening the construction workers. At present our country library of Applied Undergraduate Colleges although opened Makerspace, and they have established the related management system, but it is still in the exploratory stage. As for the specific content of the space construction and safety, management and supervision, they don't form a perfect specific regulations. There should be a standardized management system for mode selection, development planning, tool and equipment management, Maker guidance mechanism, documentation and supporting services, and space security.

G. Lack of Excellent Instructors and Resources

In order to carry out the activities smoothly, it is necessary to have relevant experts and professional technicians to guide the creation of their own works by using tools and equipment in the activities. At present, most of the Makerspaces lack excellent instructors. Although there are many college volunteers, there are very few professional volunteers who volunteer for free services. The Makerspace service is a new thing in the library. Many applied undergraduate colleges Makerspace, related literature resources need is still blank, which affects the ability to provide the corresponding industry report, special database and relevant literature information service for Makers.

III. THE DEVELOPMENT STRATEGY OF THE MAKERSPACE IN THE UNIVERSITY LIBRARY

A. Be Fixed to "Mobile" to Create Low-cost and Efficient Creation Spaces

There is no strict space marking in the creation of a Makerspace. In the case of limited conditions, the university library should not deliberately create a fixed Makerspace. The flash production space of Rogers university is a typical example. In essence, it is a low cost Makerspace, which is named for similar popular street flash show. Its characteristics are low cost, short time, fast dissemination, simple and easy operation. Nowadays, the libraries of some universities in some countries have begun to try to create similar "flash

Makerspace". Holland is located in the province of Friesland organized by the local public library system launched a mobile Makerspace project, will design a bus into "mobile" off the record "Frysklab" lab to Maker tools and books to remote rural schools regularly. Nowadays, the creation of Makerspace service is no longer limited by the fixed site. The mobile user space will enable the library to achieve instant and instant Maker service at low cost.

B. Adjust the Role of Librarians to Promote the Benign Interaction with the Makers

Applied undergraduate college librarians undertake education functions of the student readers, appear Makerspace conforms to the innovative education development needs, the new service model to break the traditional form of the relative separation of librarians and users, so as to realize the interaction of multiple roles in the open form. The entry of creating guest space requires the university library to make important adjustments in the human resource allocation so as to carry on the benign innovation support. The development of new service mode needs the adjustment or upgrading of the role of traditional librarians, and the emergence of Maker librarians, innovation specialists and innovative mentors will bring a new force to create space for users.

C. Taking into Account the Service Audience and the Hierarchy of Service Content Settings

The creation of a Makerspace service in the library provides the support of the environment, resources and opportunities for the Maker students. "Journal of Makers" magazine founder D. Dougherty said: "The Maker movement has come to the library side. Its core content is to create concept into the library, so that each of the parties to learn new skills and new knowledge more passionate". For the University Library, Makerspace resources and services in the set, taking into account the different levels of Maker students groups according to needs, can be divided into several Maker groups, such as low grade level undergraduate, undergraduate students, graduate students, or on the basis of discipline to resource allocation, namely for different majors to provide specific guidance.

D. Introducing High Quality Projects to Improve Service Quality

The initial stage of development of Library of Applied Undergraduate Colleges Makerspace the need to have a certain number of high-quality innovative projects creating space. Maker librarians should take the initiative to go deep into the actual innovation needs of Maker college students, college students will prepare creating special activities plan meets, collection project to cultivate innovative college students, and through professional review, screening, identification, and finally into the innovation plan, ensure the feasibility and effectiveness of the implementation of innovation projects.

E. Build the Docking Platform of the Results and Industry, and Realize the Innovation Output

The creation of Makerspace provides opportunities for universities to carry out deep entrepreneurship services, and further promotes the transformation of innovative and entrepreneurial results of college students. At present, China has many well-known venture capital institutions, enterprises and other industry and is willing to provide in-depth exchanges docking opportunities for college students. This construction mode is beneficial to the Maker students to provide one-stop service, so the application of Library undergraduate colleges will be shoulder liaison role, strengthen social cohesion and investment institutions and business services enterprises, arrange training resources, so that every Maker student with innovation and entrepreneurship demand has the opportunity to gain practical entrepreneurship training.

F. Establishing the Related System of Library Space Management in Library

The creation of a Makerspace is not a brief process of providing a site, a 3D printer, and a corresponding development plan, management system, etc. There is no good mechanism, and it will eventually give up halfway or even cop-out, settle a matter by leaving it unsettled waste of manpower and material resources. Therefore, must according to the characteristics of positioning a school or library set up the related system, establish different library Makerspace mode.

G. Build a Cooperative Platform to Find Capital Injection

In view of the lack of funds, the university library can build a platform to seek the injection of funds. The Makerspace of the library of Applied Undergraduate Colleges opens the door for innovation and entrepreneurship for college students, and the opening space is open. Only by seeking cooperation platform can we develop better. The alliance of enterprises or social organizations can set up a platform for the innovation and Entrepreneurship of college students, and the library is responsible for providing sites, information and organizing and managing the Maker students. In December 22, 2013, the first "Jian Mu Tang" off the record Master BOSS Cup Undergraduate elite competition started. Yuyong Long Henan Dragon Culture Communication Company undertake the activities and to plan the execution of the whole process. It build a platform for students to communicate, play, play creative, play creativity in the creation space. Tianjin University cloud printing museum experience to build a virtuous cycle of the platform for the enterprise, which can collect students' creativity, help students achieve creative dreams. The university library can also cooperate with enterprises to carry out interactive and experiential Maker education courses, hold relevant curriculum training, share the experience of completing works, stimulate students' interest in innovation and cultivate their creativity.

H. Establishing a Maker Database to Realize the Sharing of Maker Resources

Besides providing creative venues for Makers, the core function of libraries is to provide multilingual, multi-carrier, interdisciplinary literature lending services for Makers, providing cultural and creative industries, reporting and thematic database services. Shanghai library "a new space", with more than 2000 square meters of space for a Makers, equipped with multimedia touch screen, 3D printing, professional conference projection, and other audio equipment; to record Maker information resources in professional preparation, professional drawing equipment and design software, convenient conditions for the Maker readers can easily communicate with each other, show the results of their innovation stage. In 2014 May this year, the U.S. Institute of Museum and library services and the Pittsburgh children's Museum, San Francisco Museum, explore the library of North Carolina State University, the Chicago public library cooperation launched a program called project Maker@Your library and museum. Through this project, we will use museums and librarians' professional knowledge to help all libraries and museums in the United States launch "create customer space" and other projects, so as to provide effective resources and tools for Makers. Therefore, from the experience of foreign public libraries and Library of our country, our application-oriented institutions can be combined to collect all kinds of Maker information resources, establish a Maker resource database, form Maker literature information safeguard system, and realize the information resource building and sharing, to create Maker services. This has put forward higher requirements for Librarians' ability. Librarians are hard to adapt to the new service and management mode based on their existing professional knowledge structure, so they need to improve their service capabilities, computer capabilities, retrieval capabilities, refine their literature and information capabilities, and learn their abilities.

I. Improving the Tutor System of Makerspace

Employment of professional tutors is the key to the long-term and benign development of a Makerspace. Many of the current Makers are college students, they have ideas, but they are still learning in the exploration stage. Teachers need to help them summarize their knowledge and guide them. They become the creators of the ability to invent, design, plan, and make decisions. Their ideas have been sublimated. The tutor is to provide entrepreneurship consultation and guidance to Makers with the help of Makerspace, and build bridges for innovation and entrepreneurship. They can be taught in schools, engineers, skilled craftsmen from all walks of life, can also be librarians involved. The instructor should be good at discovering the personality difference of the Makers, fully excavating the potential of the Maker, and giving the directed guidance. For example, when Southwest University of Science and Technology library launched the launching of the

guest space board, Wang Heng, a professor of control theory and control engineering, invited a seminar to a Maker a class.

J. Pay Attention to Improving the Quality of the Space Librarians, and Be Good at Borrowing External Resources

The creation of Makerspace involves the application of high technology and product, which is required to be created

The Maker service librarians have certain skills and comprehensive quality. First, we can select some librarians who have strong professional skills and information literacy to carry out further education from the current librarians, so as to improve the Maker service skills and comprehensive literacy of Chuang Makerspace service librarians. Second, the university library should cooperate with the division of other schools, invite relevant professional professor acts as a consultant. Third, university libraries can also recruit volunteers who are interested in Makers and train them to meet the needs of basic Maker service, thereby reducing the workload of professional Maker service librarians, so as to ensure the quality service of Makers. Fourth, make full use of the online resources to save the library's investment in virtual learning resources and promote the sustainable development of the library. The library may introduce the MOOCs and creating project related resources or to encourage users to use their independent MOOCs related projects of all kinds of curriculum resources, convenient Makers rely on their own efforts solve their problems in a timely manner to save a Maker service resources required and the cost of training.

K. Proper Handling of Security Issues

In view of the potential safety problems in the process of creating Makerspace services, libraries of application-oriented universities can establish specialized safety systems for possible accidents, and minimize the possibility of accidents. For example, libraries of application oriented universities and colleges should provide safety courses and staff training to readers, so as to help readers better understand the basic protective measures and safety matters that should be paid attention to in practice. We should also paste detailed safety tips or instructions for the location of the equipment, and inform the readers to use the protective devices such as eye patch, earplug, mask or gloves in time. When buying equipment in a guest space, try to buy equipment that contains safety liability insurance to minimize the risk.

Besides, in the management of Makerspace, we should also take measures such as Maker reward mechanism, Maker protection of intellectual property, transformation of Maker achievement and training of space security personnel.

IV. CONCLUSION

As the center of lifelong learning for readers, libraries should play an important role in building up the Makerspace, making library creating space become "workspace, cyberspace, communication space and resource sharing

space" by Wan Gang, Minister of science and technology. S.R.Ranganathan once said "library is a growing organism", and the multi-channel transformation of Library's reader service mode is the manifestation of this organism's growth. Although the library creation space is a new thing, it will bring inspiration to the innovation of library service concept.

In promoting public entrepreneurship, innovation the new wave era under the applied university library created to provide necessary Maker service is the trend of the times the Makerspaces, is also an urgent need of readers to provide digital support and space resource supply to the university library, is an effective way to improve the applied undergraduate college library service and image the quality of service. It will lead to a new learning model, which is to promote the close combination of learning and practical applications. Of course, some problems exist in this process as long as the fight to university departments work together, and forcastly to examine and solve, believe that the library of Applied Undergraduate Colleges in the development of a new era in front of a road stride forward singing militant songs increasingly marginalized, and not even abandoned to the forgotten corner.

The emergence of a Makerspace has changed and reshaped the service mode and core value of the Applied Undergraduate Library. Makerspace plays an important role in stimulating users' potential, extending the scope of library services, enriching the way of library services, improving the social innovation ability and realizing the social value of libraries.

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