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Innovative Work of University Libraries for Assisting MOOC Instruction

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Abstract

The rise and development of MOOC brings opportunities and challenges not only to the instruction and scientific research of the universities but also to the library daily work in China's universities. On the basis of reviewing the birth and theoretical foundation of MOOC instruction, the relationship between university libraries and MOOC instruction is analyzed. Five aspects of university libraries' innovative work in the MOOC era are put forward, which include carrying out all-round publicity and promotion, providing information sharing space combined with reality, improving the MOOC literacy of subject librarians, constructing MOOC course of "Information Retrieval", and constructing the integration platform of MOOC courses. As an important teaching auxiliary department of university, libraries should continuously explore and innovate new method of work and service, and university librarians should make innovative efforts and obtain more professional abilities to assist MOOC instruction.

Key words: Innovative work; Massive open online course; University library

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INTRODUCTION

MOOC is Massive Open Online Course, it is hailed as a digital tsunami in the history of higher education development. MOOC is known as large-scale online courses. The theoretical basis of MOOC is constructivism and connectionism. The MOOC concept follows the principle of "education communism" and is an open education resource movement aimed at enhancing the wide dissemination of educational and teaching knowledge.

In the era of MOOC, how to conduct more effective research and how to provide auxiliary services for MOOC instruction is an area that researchers should strive to explore and study. Because MOOC is a relatively new form of instruction, Chinese scholars do not fully study this field. There is little research on how library work can assist the MOOC instruction, and fewer research can be found to promote librarians' innovative work particularly.

Based on the constructivism and connectionism, five aspects of university libraries' innovative work are analyzed and proposed in the paper. As an important teaching auxiliary department of university, libraries have the obligation and responsibility to continuously explore and innovate new method of service. As to the concrete method, no matter carrying out promotion, improving MOOC literacy, or constructing new courses, librarians play the most important role for assisting MOOC instruction.

1. BIRTH OF MOOC

The term of MOOC was raised by Canadian scholars Bryan Alexander and Dave Cormier in 2008. It is to provide learners with large-scale high-quality online courses through the Internet. MOOC first appeared in the United States in 2012, so the year of 2012 was called the first year of MOOC by the New York Times. In 2013,

there were several major events closely related to MOOC in China's higher education sector. Therefore, the year of 2013 was called China's first year of MOOC. The birth of MOOC is the reform and innovation of information technology and education concept. The MOOC model has broken the resource monopoly and threshold restrictions of high-quality education resources. It is or will bring subversive changes in educational concepts, teaching patterns, educational techniques, teaching methods, and teaching processes to the global educational circles (Tan, 2017). The rise and development of MOOC has also brought new opportunities and challenges to the work of university libraries.

2. THEORETICAL FOUNDATIONS OF MOOC INSTRUCTION

Constructivism and connectionism are the theoretical basis of MOOC instruction, in order to study how can a university library assist the MOOC instruction in more depth, tracing the theoretical roots of MOOC is the first step.

2.1 Constructivism

Constructivism is a theory of knowledge with roots in philosophy, psychology, and cybernetics. It is a philosophy of learning based on the premise that knowledge is constructed by the individual through his or her interactions with the environment. It has its roots in the constructivist movement of cognitive psychology, and it is improved from Cognitivism and opposite to Behaviorism, it's basically a theory about how people to learn and study. Constructivism differs from Behaviourism in that it allows and encourages learners to build on what they already know and go beyond the simple collection and memorization of information to develop individualized and internalized principles (Sánchez Gómez, 2016). Constructivism stands in contrast to mechanical conceptions of thinking and action and emphasizes the learner's role in constructing meaning, which is opposed to simple transmission from teacher to student. Constructivism is learner-centered, the focus is on knowledge construction, not knowledge reproduction. It is a belief that one constructs knowledge from one's mental structures, beliefs, and experiences that are used to interpret objects and events (Beerenwinkel & Arx, 2017).

2.1.1 Lev Vygotsky's Contribution to Constructivism

Lev Vygotsky (1896–1934) was a Russian psychologist and philosopher in the 1930s, who introduced the social aspect of learning into Constructivism. He emphasized the influences of social and cultural contexts in learning and supported a discovery model of learning. He stressed the importance of social interaction in developing cognition. He deemed that individual development derived from social interactions within which cultural meanings were

shared by the group and eventually internalized by the individual. Vygotsky (1978) stated: "Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (inter psychological) and then inside the child (intra psychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals."

According to Vygotsky, individuals establish knowledge in transaction with the environment. The most significant bases of a social constructivist theory were laid down by Vygotsky in his theory of the "Zone of Proximal Development" (ZPD) (Figure 1). In "ZPD", "P" means "Proximal" and it simply stands for "next". Vygotsky observed that the range of skills that would be developed with teacher guidance or through peer collaboration would exceed those that might be achieved by a learner working alone. That is to say, the potential for cognitive development was limited to a certain gap, which he called the ZPD. He thought that learning during the ZPD depended upon full social interaction.

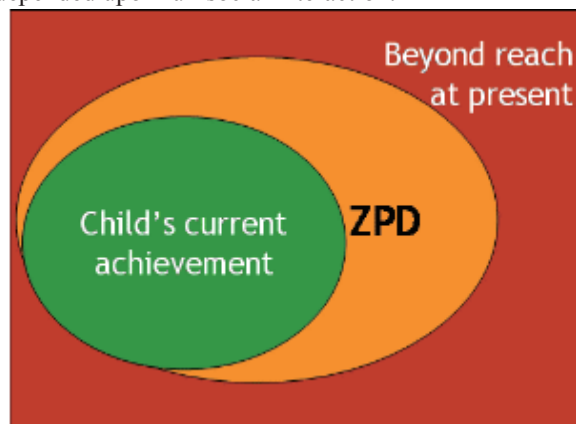


Figure 1
Zone of Proximal Development

2.1.2 Constructivist Learning Principles and Instruction Design

Constructivist learning is a prominent approach to teaching during the past several decades. The guiding principles of constructivist are listed wholly by Professor Kim Foreman at [San Francisco State University](#), they are as follows:

- Learning takes time to learn
- Learning involves language
- Learning is an active process
- Learning is a social activity
- Learning is contextual
- Learning is not the passive acceptance of knowledge
- Learning to learn as people learn
- Motivation is important
- People need knowledge to learn
- The crucial action of constructing meaning is mental

J. S. Bruner states the constructivist model like this:

“To instruct someone in a discipline is not a matter of getting him to commit results to mind. Rather, it is to teach him to participate in the process that makes possible the establishment of knowledge. We teach a subject not to produce little living libraries on the subject, but rather to get a student to think mathematically for himself, to consider matters as an historian does, to take part in the process of knowledge-getting. Knowing is a process, not a product.” Learning activities in constructivist settings are characterized by active engagement, inquiry, problem solving, and collaboration with others (Graham & Harris, 2016). Based on the constructivist learning principles, the constructivist instruction design is as follows:

- Establishing Learner-centered Instruction
- Creating Authentic Learning Environment
- Emphasizing Cooperative Learning
- Changing the Roles of Teacher

2.2 Connectionism

Connectionism is provided by an American psychologist Thorndike in the early 20th century. It is a learning theory of ideological psychology, and it is based on the experimental study of animals. Connectionism believes that the connection between situational sensation and action impulse reaction is the basis of learning and the basic unit of psychological behavior. The guiding and main inspiration of connectionism comes from the brain or nervous system. It regards cognition as the overall activity of the network. The network is a dynamic system consisting of basic units and nodes similar to neurons. Connectionism gives the network a core status, adopts distribution characterization and parallel processing theory, emphasizes parallel distribution processing of the network, and pays attention to the mathematical basis of network processing. Since the 1980s, network oriented connectivism has replaced symbolic epistemology and has become the theoretical basis of modern cognitive psychology.

Connectionism is a method to the study of human cognition that uses mathematical models, it is known as connectionist networks or artificial neural networks. Often, these come in the form of highly interconnected, neuron-like processing units. There is no sharp dividing line between connectionism and computational neuroscience, but connectionists tend more often to abstract away from the specific details of neural functioning to focus on high-level cognitive processes.

3. RELATIONSHIP BETWEEN UNIVERSITY LIBRARIES AND MOOC INSTRUCTION

The main functions of University libraries are educational and informational service functions, as it is mentioned in the *Regulations for China's Ordinary Universities*

Libraries Work issued by the Ministry of Education in December 2015; The main tasks of university library include continuously expanding and deepening services, actively participating in cultivating talents, informatization construction and campus culture construction. In March 2013, Online Computer Library Center held a conference on library-MOOC relations around the world. The conference showed that the library has the ability to participate in MOOC teaching and has the ability to provide resources, technology, copyright services for MOOC courses. The conference also points out that libraries play an important role in the management, training, and media promotion of MOOC. MOOC is a collection of high-quality educational resources in the world and a major reform and innovation in higher education (Schuwer, et al, 2015).

The university library is the center of university literature and digital resources, and it is an auxiliary institution for teaching and research services in universities. University library is also an important support and guarantee for MOOC construction and instruction, because it can provide rich and plenty information resources. Providing resources guarantee and service for the instruction and scientific research is the basic duty and important mission of the university library, for fulfilling this duty, high quality digital information resources, abundant human resources and advanced information infrastructure are the fundamental necessities. The university library is a gathering place of information resources needed for instruction and scientific research in colleges and universities (Uskov, et al, 2016). It is also an important channel for the acquisition, analysis, generation and dissemination of the information in MOOC instruction. Therefore, university library and MOOC instruction are natural partnerships. University library have the responsibility and obligation to undertake the teaching and auxiliary functions in depth. It should explore new methods and new paths for developing MOOC instruction services, expand the service scope, and improve the service standards.

4. INNOVATIVE WORK OF UNIVERSITY LIBRARIES

How to participate in MOOC instruction in the MOOC era, how to demonstrate the service value of libraries in the new educational environment, how to innovate the service model of university libraries, and how to improve the professionalism of university librarians are important topics facing university libraries.

4.1 Carrying out All-Round Publicity and Promotion

The university library is the main depository, manager and provider of educational resources. It is university library's

natural mission to publicize, promote and effectively provide educational resources. University libraries can conduct all-round publicity and promotion of MOOC instruction through the method of publicity exhibitions, new media promotion, award-winning questionnaires, and expert lectures.

Various activities and help learners understand MOOC's development history, object characteristics, educational concepts, teaching models, teaching methods, teaching processes, teaching characteristics, and resource quality etc. University library can also make full use of digital information media to promote MOOC instruction. For example, the official website's rolling promotion column, the article pushed by WeChat Public, electronic poster campaign in the library lobby, the promotion in the information retrieval course. In the process of promoting MOOC instruction, university libraries should also actively seek the support of superiors and other administrative departments, increase publicity and promotion efforts for pushing MOOC instruction, and increase MOOC's influence and recognition in the whole university.

4.2 Providing Information Sharing Space Combined with Reality

As the main body for the storage, management and provision of university literature and information resources, university libraries have a large number of paper and digital information resources that can be retrieved, used and stored. University library is equipped with a perfect information infrastructure and it masters advanced information service technologies. The implementation of MOOC instruction needs the guarantee of the space conditions such as network learning space, resource information storage space, and research and exchange space. Modern university libraries have infrastructure services such as electronic reading rooms, digital reading area, and virtual reference consulting services etc. In order to facilitate the learners to use the information resources and promote the exchange and interaction of information resources, most university libraries provide research rooms with various functions to learners and readers. University libraries can integrate existing building conditions, hardware and software facilities, Internet information resources, information storage space, and training and research space to provide realistic and virtual spaces that combine online and offline functions to MOOC learners (Mazurov, 2015). The information sharing space provided by university libraries has rich paper and digital literature resources, modern multimedia network equipment, specialized databases, professional librarians, and elegant learning environments.

All the hardware and software conditions in university library meet the college students' requirements for the online and offline learning environment, learning atmosphere and learning taste. This kind of virtual and

realistic information sharing space brings together a large amount of information resources, provides real-time learning facilities, has professional information retrieval experts, and collects high-quality hardware and software facilities. And this information sharing space integrates different functions such as learning, communication, testing, researching, analyzing and evaluation. It is an ideal innovative service model that university libraries can provide for their learners.

4.3 Improving the MOOC Literacy of Subject Librarians

With the increasing content of MOOC courses and the continuous expansion of its professional fields, the auxiliary reference materials for MOOC instruction are difficult to meet the needs of MOOC learners' needs in terms of quantity, quality, and organizational presentation. College librarians have responsibilities and should be able to act as a guide for MOOC learners to access online reference materials. College librarians have unique advantages in collecting MOOC instruction information, searching for professional digital data, and obtaining online auxiliary reference materials (Lee, et al, 2016). Moreover, college librarians are mostly familiar with the subject, majors and professional settings of their universities and can provide individual reference services for MOOC learners. University librarians can use their advantages in information search, resource supply, knowledge management, and data collation to effectively search, organize, manage, disclose, and navigate the auxiliary reference materials of MOOC. When differentiating between online auxiliary reference materials, the University librarians should not only fully exploit the resources of the library's collections related to the MOOC course, but also pay attention to the open access to Internet resources and data information. For the latter, professional subject librarians should be arranged to conduct research, excavation, identification, management, and reorganization in a multidisciplinary, professional, and targeted manner, ensuring that MOOC learners are provided with authoritative, orderly, comprehensive, novel, and practical MOOC learning aids.

Librarians with high MOOC literacy are indispensable conditions for university libraries to participate in MOOC instruction, such as librarians who are proficient in computer network technology, video production, WeChat public maintenance, software programming, data statistical analysis, and copyright legal knowledge etc. In order to enable librarians to become good housekeepers, good assistants, good consultants and an indispensable expert for MOOC instruction, it is particularly important to strengthen the professional qualities of university librarians (Zhang, 2018). One of the ways to effectively improve MOOC literacy of university librarians is to encourage librarians to embed themselves in MOOC instruction and participate in the design, production,

management, maintenance, and statistics of MOOC instruction. In the process of retrieval and collation of literature resources, in participating in the design and modification of MOOC, and in the process of studying copyright, use and sharing of MOOC, university libraries can provide help for MOOC teaching and improve the abilities of their own.

Through actively participating in MOOC instruction, college librarians can pay attention to the direction of MOOC's development, personally experience MOOC's learning process and organizational system, and can directly experience MOOC's teaching effects. Accurate identification of the challenges and problems faced by teaching staff when teaching to tens of millions of learners can also inspire university librarians to generate new thinking and gain new inspiration in the process of assisting MOOC instruction.

4.4 Constructing MOOC Courses of "Information Retrieval"

Information literacy is the ability of individuals to recognize when information is needed and when individuals are able to conduct effective information search, information assessment and information utilization. The American Library Society defines Information literacy as follows: information literacy is the ability to determine when information is needed and know how to obtain, evaluate and use the information needed. College librarians have a relatively high professional level in information literacy, and the teaching of "Information Retrieval" course is usually one of the important course of MOOC instruction in university libraries. The MOOC course of "Information Retrieval" can directly cultivate and improve learners' information literacy, and it can also promote MOOC teaching more directly. The MOOC course of "Information Retrieval" is the most direct and effective way for university libraries to participate in MOOC instruction and promotion. This new teaching method can not only improve the teaching effect of the "Information Retrieval" course, promote the teaching reform of the "Information Retrieval" course, but also enable university librarians to directly practice MOOC instruction.

University librarians would have the opportunity to conduct more in-depth thinking, to optimize the steps, methods, organization, evaluation and effects of MOOC instruction. With the hardware and software facilities of university libraries and their own professional qualities, college librarians can not only assist MOOC learners in online learning, but also provide face-to-face offline guidance to MOOC learners. They can point out learning priorities, explain difficult knowledge points, and detect learning conditions for MOOC learners, they also can answer the problems and difficulties encountered by learners in MOOC learning. As the implementer and participant of the MOOC course of Information

Retrieval, college librarians can experience, examine and participate in the whole process of MOOC teaching from the perspective of both educators and course learners. It is convenient for them to find the advantages and existing problems of MOOC teaching and learning from two perspectives, and it is possible for them to explore efficient ways to solve the problems.

4.5 Construct the Integration Platform of MOOC Courses

In the construction of library resources, MOOC courses should be adopted and constructed as digital resources. University libraries should take the advantages of librarians' ability in cataloguing books, build a platform for the integration of MOOC courses and learning materials, and collect and disclose MOOC course resources through various channels. University librarians can also index, rank and organize the MOOC resources according to the subject or theme of the resources, and present the MOOC curriculum in a way that is easy for learners to understand. Therefore, a systematic MOOC educational platform for more effective use can be established. Take transport colleges and universities as an example. Transport university libraries can collect transportation MOOC courses and build a MOOC course platform with transportation characteristics, and the resources can come both inside and outside the university, and both from China and abroad. The resource navigation, classification link, and promotion evaluation of the MOOC course with transportation characteristics can be established on the library website of university, so that learners of transportation majors can conduct selective and focused major study.

CONCLUSION

The coming of MOOC era brings opportunities and challenges for the development of university libraries. Developing MOOC instruction service is a natural extension and innovation of the functional boundaries of university libraries. As an important teaching auxiliary department of university, libraries have the obligation and responsibility to continuously explore and innovate new method of service, and university librarians should make innovative efforts and obtain the professional ability to provide first-class MOOC instruction assistance, MOOC resource support and MOOC information service for the learners, educators and researchers in the university.

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